Wide Format Scanner

Technical Service Manual

FSC x040 CHROMA, FSC x050 MAGNUM, FSS 225x PANORAMA, and CRYSTAL 40

FSF/TSM/001 (1.5c)

Part Number 6799A127

1 **DOCUMENT REVISION RECORD**

2 **LIST OF DOCUMENTS**

3 **FSF MAINTENANCE MANUAL**
FSC x040 CHROMA, FSC x050 MAGNUM,
FSS 225x PANORAMA, and CRYSTAL 40

4

5

6

7

8

9 **SPARE PARTS AND SERVICE ACCESSORIES**
FSC x040 CHROMA, FSC x050 MAGNUM,
FSS 225x PANORAMA, and CRYSTAL 40

10 **TECHNICAL SERVICE BULLETINS**

contex
SCANNING TECHNOLOGY

Document Revision Record

DRR

REV.	DATE	CHANGED BY	PAGES AFFECTED	BRIEF DESCRIPTION OF CHANGE
1.0	990927	BN/LM	All	Original Issue of Document
1.1	991201	BN/LM	All	FSF/MTM/001 (1.1) SOF/PLS/007 (1.2)
1.2	000614	BN/LM	All	FSF/MTM/001 (1.2) SOF/PLS/007 (1.3)
1.3	000901	BN/LM	All	SOF/PLS/007 (1.4)
1.4	010919	BN/LM	All	FSF/MTM/001 (1.3) SOF/PLS/007 (1.5)
1.5	020927	BN/LM	All	SOF/PLS/007 (1.6)
1.5a	030623	LM		FSF/TSB/001 added
1.5b	030922	LM		FSF/TSB/002 added
1.5c	050607	LM		Document Revision Record added FSF/TSB/003 added

List of Documents:

FSF/MTM/001	(1.3)	FSF Maintenance Manual FSC x040 CHROMA, FSC x050 MAGNUM, FSS 225x PANORAMA, and CRYSTAL 40
SOF/PLS/007	(1.6)	Spare Part and Service Accessories FSC x040 CHROMA, FSC x050 MAGNUM, FSS 225x PANORAMA, and CRYSTAL 40
FSF/TSB/001	(1.0)	Ageing of Fluorescent Lamps
FSF/TSB/002	(1.0)	Cracking solder joints on SMPS

TITLE:	FSF MAINTENANCE MANUAL FSC x040 CHROMA and FSC x050 MAGNUM FSS 225x PANORAMA and CRYSTAL 40	
DOC. NO.:	FSF/MTM/001	
PREPARED BY:	BN/LM	
AUTHORIZED:	JR	
DISTRIBUTION:	Tegningsarkiv, Svendborg PT, Svendborg DD	(1) (1) (1)
ISSUE REVISION:		1.3
DATE:		2001-09-19

A P P R O V E D B Y:

AUTHORITY	DATE	SIGNATURE

This document is the property of Contex A/S. The data contained herein, in whole or in part, may not be duplicated, used or disclosed outside the Recipient for any purpose other than to conduct technical evaluation. This restriction does not limit the Recipients right to use information contained in the data if it is obtained from another source without restriction..

contex
SCANNING TECHNOLOGY

Document Revision Record

DRR

REV.	DATE	CHANGED BY	PAGES AFFECTED	BRIEF DESCRIPTION OF CHANGE
1.0	990927	BN	All	Original issue of document
1.1	991201	BN	All	CHROMA variants added Definition of Board Revision changed to reflect *functionality* only (Sec. 3.1).
1.2	0000614	BN	All	PANORAMA variants added Changed description of Updating of Light Profiles, 2.5.3. Minor changes in 8.1 and 8.2
1.3	010919	BN	All	CRYSTAL 40 added. Test 9 of SCANtest 6, rel. 1 supports Software Oscilloscope.

Table of Contents

LIST OF FIGURES 7

1. INTRODUCTION 9

2. GENERAL DESCRIPTION 10

2.1 FSC x040 CHROMA AND FSC x050 MAGNUM COLOR SCANNERS 10
2.2 FSS225x PANORAMA AND CRYSTAL 40 MONOCHROME SCANNERS 14
2.3 SMPS, SWITCH MODE POWER SUPPLY 16
2.4 LMD, MOTOR AND LAMP DRIVER BOARD 16
2.4.1 Lamp Driver *16*
2.4.2 Stepper Motor Control *16*
2.4.3 Automatic Voltage Switching *16*
2.5 CBC, CAMERA BOARD (MAGNUM AND CHROMA ONLY) 18
2.5.1 Color CCD Chip *18*
2.5.2 Wolfson Scanner Processor *18*
2.5.3 Automatic Updating of Light Profile Correction and Stitching *19*
2.5.4 Line RAM *20*
2.6 CBB, CAMERA BOARD (PANORAMA AND CRYSTAL ONLY) 22
2.6.1 Wolfson Scanner Processor *22*
2.6.2 Automatic Updating of Light Profile Correction and Stitching *23*
2.6.3 Line RAM *23*
2.7 SUA, SCANNER UNIT 25
2.7.1 Processor Module *25*
2.7.2 Data Acquisition Module *25*
2.7.3 Double Buffer Module *26*
2.7.4 Stepper Motor Pulse Generator *27*
2.7.5 SCSI Interface *27*
2.8 SCR, SMART CARD READER 29
2.9 SKC, OPERATOR PANEL 31

3. ELECTRICAL CHECK AND ADJUSTMENTS 33

3.1 MARKING CODES FOR CIRCUIT BOARDS AND PROGRAMMED DEVICES 33
3.2 DOWNLOADING SCANNER FIRMWARE 33
3.2.1 Erase and Restore Parameter Blocks *34*
3.3 CHECK AND ADJUSTMENT OF THE SWITCH MODE POWER SUPPLY, SMPS 35
3.3.1 AC Voltages *35*
3.3.2 DC Voltages *35*
3.3.3 Adjustments *35*
3.3.4 Fuses *36*
3.3.5 Markings *36*
3.3.6 Jumper Settings *36*
3.3.7 Hints *36*
3.4 CHECK AND ADJUSTMENT OF LAMP AND MOTOR DRIVER BOARD, LMD 38
3.4.1 DC Voltages *38*
3.4.2 Lamp-Driver Adjustment *38*
3.4.3 Stepper Motor Reference Voltages *39*
3.4.4 Fuses *39*
3.4.5 Markings *39*
3.4.6 Jumper Settings *40*
3.4.7 Hints *40*
3.5 CHECK AND ADJUSTMENT OF CAMERA BOARD, CBC (MAGNUM AND CHROMA ONLY) 42
3.5.1 Supply Voltages *42*
3.5.2 Adjustments *42*
3.5.3 Functional Test *42*

3.5.4 Markings *42*
3.5.5 Jumper Settings *42*
3.5.6 Hints *42*
3.6 CHECK AND ADJUSTMENT OF CAMERA BOARD, CBB (PANORAMA AND CRYSTAL ONLY) 45
3.6.1 Supply Voltages *45*
3.6.2 Functional Test *45*
3.6.3 Markings *45*
3.6.4 Jumper Settings *45*
3.6.5 Hints *45*
3.7 CHECK OF SCANNER UNIT, SUA 47
3.7.1 Supply Voltages *47*
3.7.2 Adjustments *47*
3.7.3 Functional Test *47*
3.7.4 Markings *47*
3.7.5 Switch Settings (Download Control Switches) *47*
3.7.6 Jumper Settings *48*
3.7.7 Signal LEDs on the SUA-Board *48*
3.7.8 Hints *48*
3.8 CHECK OF OPERATOR PANEL, SKC 50
3.8.1 Supply Voltages *50*
3.8.2 Functional Test *50*
3.8.3 Markings *50*
3.8.4 Switch Setting (Scanner ID) *50*
3.9 CHECK OF SMART CARD READER, SCR 52
3.9.1 DC Voltages *52*
3.9.2 Functional Test *52*
3.9.3 Markings *52*
3.9.4 Switch Setting (SCSI ID) *52*
3.9.5 Signal LED on the SCR-Board *53*
3.9.6 Hints *53*
3.10 CHECK OF LAMP SENSOR BOARD, OSB 55
3.10.1 Functional Test *55*
3.10.2 Markings *55*
3.11 CHECK OF OPTOINTERRUPTER BOARD, OIBA 55
3.11.1 Functional Test *55*
3.11.2 Markings *55*
3.12 ADJUSTMENT OF ORIGINAL SENSORS 57
3.12.1 Adjustment of Switch Point *57*
3.12.2 Functional Test *57*
3.12.3 Hints *57*
3.13 CHECK OF MEDIA THICKNESS DETECTOR 59
3.13.1 Functional Test *59*

4. CCD-CAMERAS 60

4.1 DESCRIPTION OF CCD-CAMERAS 60
4.2 CCD-CAMERA ADJUSTMENT 64
4.2.1 Light Profiles *64*
4.2.2 Focus *72*
4.2.3 Scan-Width *77*
4.2.4 CCD-Centering *83*
4.2.5 Vertical Positioning *84*
4.2.6 Final Check *85*

5. STITCHING AND VERTICAL ALIGNMENT 94

5.1 PRINCIPLE OF STITCHING 94
5.2 STITCHING ADJUSTMENT 94
5.2.1 Vertical Alignment *95*
5.3 STITCHING AND VERTICAL ALIGNMENT 99
5.3.1 FSC x040 CHROMA *99*

5.3.2 FSC x050 MAGNUM 102
5.3.3 FSS 225x PANORAMA and CRYSTAL 40 105

6. MAINTENANCE CHECK OF CCD-CAMERA ADJUSTMENTS 108

6.1 LIGHT PROFILE 108
6.2 FOCUS 116
6.3 SCAN-WIDTH, CCD-CENTERING AND VERTICAL POSITIONING 120

7. GENERAL MAINTENANCE 133

7.1 STEP BY STEP PROCEDURE FOR GENERAL MAINTENANCE 133
7.1.1 Remove Top Cover 133
7.1.2 Cleaning of the Scanning Area 133
7.1.3 Fluorescent Lamps 133
7.1.4 Check Lamp Driver Adjustment 133
7.1.5 Check CCD-Camera Adjustment 134
7.1.6 Readjustment of CCD-Cameras 134
7.1.7 Mount Top Cover 134
7.1.8 Check Stitching and Vertical Alignment 134
7.1.9 Calibrate Scanner 134

8. TROUBLESHOOTING 138

8.1 POWER-ON SELF-TEST 138
8.2 ERROR CODES 138
8.2.1 Error Codes displayed on the Operator Panel 138
8.2.2 Error Codes displayed on the PC Screen 139
8.3 TROUBLESHOOTING HINTS 142

9. DISASSEMBLY AND ASSEMBLY 145

9.1 TOP COVER WITH FRONT PROFILE 145
9.1.1 Front Profile 145
9.1.2 Smart Card Reader on MAGNUM, up to s/n 00275 145
9.2 END COVERS 146
9.3 REAR COVER 146
9.4 BOTTOM PLATE 146
9.5 TOP PROFILE (LID) 146
9.6 GLASS PLATE 146
9.7 ENTRY ROLLER SHIELD 146
9.8 EXIT ROLLER SHIELD 147
9.9 MIRROR CHASSIS 147
9.10 REFLECTOR ASSEMBLY 148

10. REPLACEMENT OF PARTS 149

10.1 FEED ROLLER SHAFT 149
10.2 ORIGINAL SENSOR ACTUATORS 150
10.3 STITCHING WIRE 150
10.4 FLUORESCENT LAMPS 150
10.5 STEPPER MOTOR 151
10.6 LAMP SENSOR BOARD, OSB 151
10.7 DUST FILTER ON FAN 152
10.8 WHITE BACKGROUND PLATE 152
10.9 SLIDER FOR MEDIA THICKNESS ADJUSTMENT 152

11. SCANTEST 4 156

11.1.1 Test 1, Scanner Information 157
11.1.2 Test 2, LED Test 157
11.1.3 Test 3, Key Test 157
11.1.4 Test 4, Original-Sensor Test 157
11.1.5 Test 5, Lamp Test 157
11.1.6 Test 6, Motor Test 158

11.1.7 Test 7, Complete Hardware Test 158
11.1.8 Test 9, Camera Adjustment 158
11.1.9 Test 10, Check Camera Adjustment 158
11.1.10 Test 11, Stitching and Vertical Alignment 159
11.1.11 Test 12, Adjustment of Y-Axis Scaling 159
11.1.12 Test 13, Switch Scanner to Test Mode 159
11.1.13 Test 16, Basic Calibration 159
11.1.14 Test 20, Noise Test 160
11.1.15 Test 21, SCANdump 162

12. WIRING DIAGRAMS 163

13. SPECIAL SERVICE TOOLS 170

List of Figures

FIG. 2-1 FSC X040 CHROMA BLOCK DIAGRAM 12
FIG. 2-2 FSC X050 MAGNUM BLOCK DIAGRAM 13
FIG. 2-3 FSS 225X PANORAMA, CRYSTAL 40 BLOCK DIAGRAM 15
FIG. 2-4 LMD BLOCK DIAGRAM 17
FIG. 2-5 CBC BLOCK DIAGRAM 21
FIG. 2-6 CBB BLOCK DIAGRAM 24
FIG. 2-7 SUA BLOCK DIAGRAM 28
FIG. 2-8 SCR BLOCK DIAGRAM 30
FIG. 2-9 SKC BLOCK DIAGRAM 32
FIG. 3-1 SMPS TEST POINTS 37
FIG. 3-2 LMD COMPONENT LAYOUT 41
FIG. 3-3 CBC COMPONENT LAYOUT 44
FIG. 3-4 CBB COMPONENT LAYOUT 46
FIG. 3-5 SUA COMPONENT LAYOUT 49
FIG. 3-6 SKC COMPONENT LAYOUT 51
FIG. 3-7 SCR COMPONENT LAYOUT 54
FIG. 3-8 OSB COMPONENT LAYOUT 56
FIG. 3-9 OIBA COMPONENT LAYOUT 56
FIG. 3-10 ADJUSTMENT OF ORIGINAL-SENSORS 58
FIG. 4-1 CCD-CAMERA, SIDE VIEW 62
FIG. 4-2 OSCILLOSCOPE IMAGES FOR CAMERA ADJUSTMENT 63
FIG. 4-3 FSC X040 CHROMA LIGHT PROFILES, UNCORRECTED 66
FIG. 4-4 FSC X040 CHROMA LIGHT PROFILES, CORRECTED 67
FIG. 4-5 FSC X050 MAGNUM LIGHT PROFILES, UNCORRECTED 68
FIG. 4-6 FSC X050 MAGNUM LIGHT PROFILES, CORRECTED 69
FIG. 4-7 FSS 225X PANORAMA, CRYSTAL 40, LIGHT PROFILES, UNCORRECTED 70
FIG. 4-8 FSS 225X PANORAMA, CRYSTAL 40, LIGHT PROFILES, CORRECTED 71
FIG. 4-9 FSC X040 CHROMA FOCUS SIGNALS 74
FIG. 4-10 FSC X050 MAGNUM FOCUS SIGNALS 75
FIG. 4-11 FSS 225X PANORAMA, CRYSTAL 40, FOCUS SIGNALS 76
FIG. 4-12 FSC X040 CHROMA, SCAN-WIDTH 79
FIG. 4-13 FSC X050 MAGNUM, SCAN-WIDTH (1) 80
FIG. 4-14 FSC X050 MAGNUM, SCAN-WIDTH (2) 81
FIG. 4-15 FSS 225X PANORAMA, CRYSTAL 40, SCAN-WIDTH 82
FIG. 4-16 FSC X040 CHROMA, CCD-CENTERING AND VERTICAL POSITIONING 86
FIG. 4-17 FSC X050 MAGNUM, CCD-CENTERING AND VERTICAL POSITIONING (1) 87
FIG. 4-18 FSC X050 MAGNUM, CCD-CENTERING AND VERTICAL POSITIONING (2) 88
FIG. 4-19 FSS 225X PANORAMA, CRYSTAL 40, CCD-CENTERING AND VERTICAL POSITIONING 89
FIG. 4-20 TEST POINTS FOR CAMERA ADJUSTMENTS 90
FIG. 4-21 CCD-CAMERA, TOP VIEW 91
FIG. 4-22 OPTICAL ADJUSTMENT PATTERNS 92
FIG. 4-23 FOCUS PATTERN 93
FIG. 5-1 PRINCIPLE OF STITCHING 96
FIG. 5-2 STITCHING WIRE MOUNTING 97
FIG. 5-3 STITCHING ADJUSTMENT CHART 98
FIG. 5-4 FSC X040 CHROMA, STITCHING IMAGES 101
FIG. 5-5 FSC X050 MAGNUM, STITCHING IMAGES 104
FIG. 5-6 FSS 225X PANORAMA, CRYSTAL 40, STITCHING IMAGES 107
FIG. 6-1 FSC X040 CHROMA, LIGHT PROFILES UNCORRECTED (WBP) 110
FIG. 6-2 FSC X040 CHROMA, LIGHT PROFILES CORRECTED (WBP) 111
FIG. 6-3 FSC X040 CHROMA, LIGHT PROFILES CORRECTED (BCS) 111
FIG. 6-4 FSC X050 MAGNUM, LIGHT PROFILES UNCORRECTED (WBP) 112
FIG. 6-5 FSC X050 MAGNUM, LIGHT PROFILES CORRECTED (WBP) 113
FIG. 6-6 FSC X050 MAGNUM, LIGHT PROFILES CORRECTED (BCS) 113
FIG. 6-7 FSS 225X PANORAMA, CRYSTAL 40, LIGHT PROFILES UNCORRECTED (WBP) 114
FIG. 6-8 FSS 225X PANORAMA, CRYSTAL 40, LIGHT PROFILES CORRECTED (WBP) 115

FIG. 6-9 FSS 225X PANORAMA, CRYSTAL 40, LIGHT PROFILES CORRECTED (BCS) 115
FIG. 6-10 FSC X040 CHROMA, FOCUS SIGNALS UNCORRECTED 117
FIG. 6-11 FSC X040 CHROMA, FOCUS SIGNALS CORRECTED 117
FIG. 6-12 FSC X050 MAGNUM, FOCUS SIGNALS UNCORRECTED 118
FIG. 6-13 FSC X050 MAGNUM, FOCUS SIGNALS CORRECTED 118
FIG. 6-14 FSS 225X PANORAMA, CRYSTAL 40, FOCUS SIGNALS UNCORRECTED 119
FIG. 6-15 FSS 225X PANORAMA, CRYSTAL 40, FOCUS SIGNALS CORRECTED 119
FIG. 6-16 FSC X040 CHROMA, CAMERA A, SCANLINE START 123
FIG. 6-17 FSC X040 CHROMA, CAMERA A, SCANLINE END 123
FIG. 6-18 FSC X040 CHROMA, CAMERA B, SCANLINE START 124
FIG. 6-19 FSC X040 CHROMA, CAMERA B, SCANLINE END 124
FIG. 6-20 FSC X040 CHROMA, CAMERA C, SCANLINE START 125
FIG. 6-21 FSC X040 CHROMA, CAMERA C, SCANLINE END 125
FIG. 6-22 FSC X050 MAGNUM, CAMERA A, SCANLINE START 126
FIG. 6-23 FSC X050 MAGNUM, CAMERA A, SCANLINE END 126
FIG. 6-24 FSC X050 MAGNUM, CAMERA B, SCANLINE START 127
FIG. 6-25 FSC X050 MAGNUM, CAMERA B, SCANLINE END 127
FIG. 6-26 FSC X050 MAGNUM, CAMERA C, SCANLINE START 128
FIG. 6-27 FSC X050 MAGNUM, CAMERA C, SCANLINE END 128
FIG. 6-28 FSC X050 MAGNUM, CAMERA D, SCANLINE START 129
FIG. 6-29 FSC X050 MAGNUM, CAMERA D, SCANLINE END 129
FIG. 6-30 FSS 225X PANORAMA, CRYSTAL 40, CAMERA A, SCANLINE START 130
FIG. 6-31 FSS 225X PANORAMA, CRYSTAL 40, CAMERA A, SCANLINE END 130
FIG. 6-32 FSS 225X PANORAMA, CRYSTAL 40, CAMERA B, SCANLINE START 131
FIG. 6-33 FSS 225X PANORAMA, CRYSTAL 40, CAMERA B, SCANLINE END 131
FIG. 6-34 FSS 225X PANORAMA, CRYSTAL 40, CAMERA C, SCANLINE START 132
FIG. 6-35 FSS 225X PANORAMA, CRYSTAL 40, CAMERA C, SCANLINE END 132
FIG. 7-1 BASIC-CALIBRATION SHEET 135
FIG. 7-2 IT8 COLOR CALIBRATION SHEET, CHROMA 136
FIG. 7-3 IT8 COLOR CALIBRATION SHEET, MAGNUM 137
FIG. 10-1 TRANSMISSION 153
FIG. 10-2 DRIVE-BELT TIGHTENER 154
FIG. 10-3 SCANNER CROSS SECTION 155
FIG. 11-1 NOISE TEST, EXAMPLE 161
FIG. 12-1 FSC X040 CHROMA PRIMARY WIRING 164
FIG. 12-2 FSC X040 CHROMA SECONDARY WIRING 165
FIG. 12-3 FSC X050 MAGNUM PRIMARY WIRING 166
FIG. 12-4 FSC X050 MAGNUM SECONDARY WIRING 167
FIG. 12-5 FSS 225X PANORAMA, CRYSTAL 40, PRIMARY WIRING 168
FIG. 12-6 FSS 225X PANORAMA, CRYSTAL 40, SECONDARY WIRING 169

1. Introduction

The purpose of this Maintenance Manual is to provide technical information to support board-level troubleshooting and maintenance of the Wide Format Scanners:

FSC x050 MAGNUM (generic model designation FA67A)

FSC x040 CHROMA (generic model designation FB67A)

FSS 225x PANORAMA alias PANORAMA 50 (generic model designation FC67A)

CRYSTAL 40 (generic model designation FD67A)

Chapter 2 contains a general technical description based on block diagrams.

Chapter 3 describes Electrical Check and Adjustments including jumper and switch settings.

Chapter 4 contains a general description of the Optical System and the CCD-Camera Adjustments.

Chapter 5 describes Stitching and Vertical Alignment.

Chapter 6 contains a set of screen images to be used for Maintenance Check of the CCD-Camera adjustment.

Chapter 7 describes General Maintenance.

Chapter 8 contains a list of Error Codes and gives some hints on troubleshooting.

Chapter 9 describes Disassembly and Assembly procedures.

Chapter 10 provides a guide for replacement of parts for which the procedure is not obvious.

Chapter 11 describes the scanner test program, SCANtest 4.
SCANtest 6, rel. 1 *and* firmware rel. 0031 or later supports “Software Oscilloscope” in Test 9.

Chapter 12 contains Wiring Diagrams.

Chapter 13 contains a list of Special Service Tools.

2. General Description

The Wide Format Color and Monochrome Scanners, which are marketed under the following product names:

FSC3050 MAGNUM
FSC6050 MAGNUM
FSC8050 MAGNUM

FSC3040 CHROMA
FSC6040 CHROMA
FSC8040 CHROMA

FSS2250 PANORAMA alias PANORAMA 50
FSS2251 PANORAMA alias PANORAMA 50 PLUS

CRYSTAL 40
CRYSTAL 40 PLUS

and the modules:

SMPS, Switch Mode Power Supply

LMDA, Lamp and Motor Driver Board
CBCA, Camera Board (MAGNUM, CHROMA)
CBBB, Camera Board (PANORAMA, CRYSTAL)
SUAB, Scanner Unit (MAGNUM, CHROMA)
SUAC, Scanner Unit (PANORAMA, CRYSTAL)
SKCA, Operator Panel Board
SCRA, Smart Card Reader

are described at block-diagram level in Sections 2.1 through 2.9.

For installation of the ASPI compatible SCSI Adapter that is included with the Interface Kit for PC, refer to the Operator's Guide for the Wide Format Color Scanners and the User's Guide for the WIDEimage scanning application.

2.1 FSC x040 CHROMA and FSC x050 MAGNUM Color Scanners

The Block Diagrams are shown in:

Fig. 2-1 FSC x040 CHROMA Block Diagram, page 12
Fig. 2-2 FSC x050 MAGNUM Block Diagram, page13

The functionality of the CHROMA and MAGNUM Wide Format Color Scanners, such as

- max. image resolution
- scanning speed
- digital image processing

depends on a Smart Card located behind the Model Streamer on the Front Profile of the scanner.

The CHROMA and MAGNUM scanner range consists of:

Generic Model	Product Name (Smart Card)	Scan Width (inches)	No. of Cameras	Optical Resolution (dpi)	Level of Functionality (Smart Card)
FB67A	FSC3040 CHROMA	40	3	390	Basic
-	FSC6040 CHROMA	40	3	390	Medium
-	FSC8040 CHROMA	40	3	390	High
FA67A	FSC3050 MAGNUM	50	4	400	Basic
-	FSC6050 MAGNUM	50	4	400	Medium
-	FSC8050 MAGNUM	50	4	400	High

The scan-area is illuminated by two white fluorescent lamps. The light output from the lamps is stabilized by feedback to the lamp power supply board (LMD).
Each CCD-Camera in the scanner contains one 5363 x 3 pixel color CCD. The output signals from the CCDs are Light Profile Corrected at pixel level.

In order to stitch (bring together) scanlines from adjacent cameras, the fields of vision of the CCD-Cameras overlap slightly and a thin, black wire placed within the overlapped fields of vision marks the virtual end, respectively start, of adjacent scanlines.
The scanlines from the individual cameras are mechanically aligned in the vertical direction.

All scanning and image processing functions are contained on only two boards, the Camera Board (CBC) and the Scanner Unit Board (SUAB).

The scanner has one dual SCSI Port (SCAN SCSI 0-A and 0-B) used for normal Scan-to-File operations, and one single SCSI Port (COPY SCAN 1) used when a separate Copy-PC configuration is attached simultaneously with a Scan-to-File PC.
The interface is SCSI-3 with a transfer rate up to 20 MB/s.

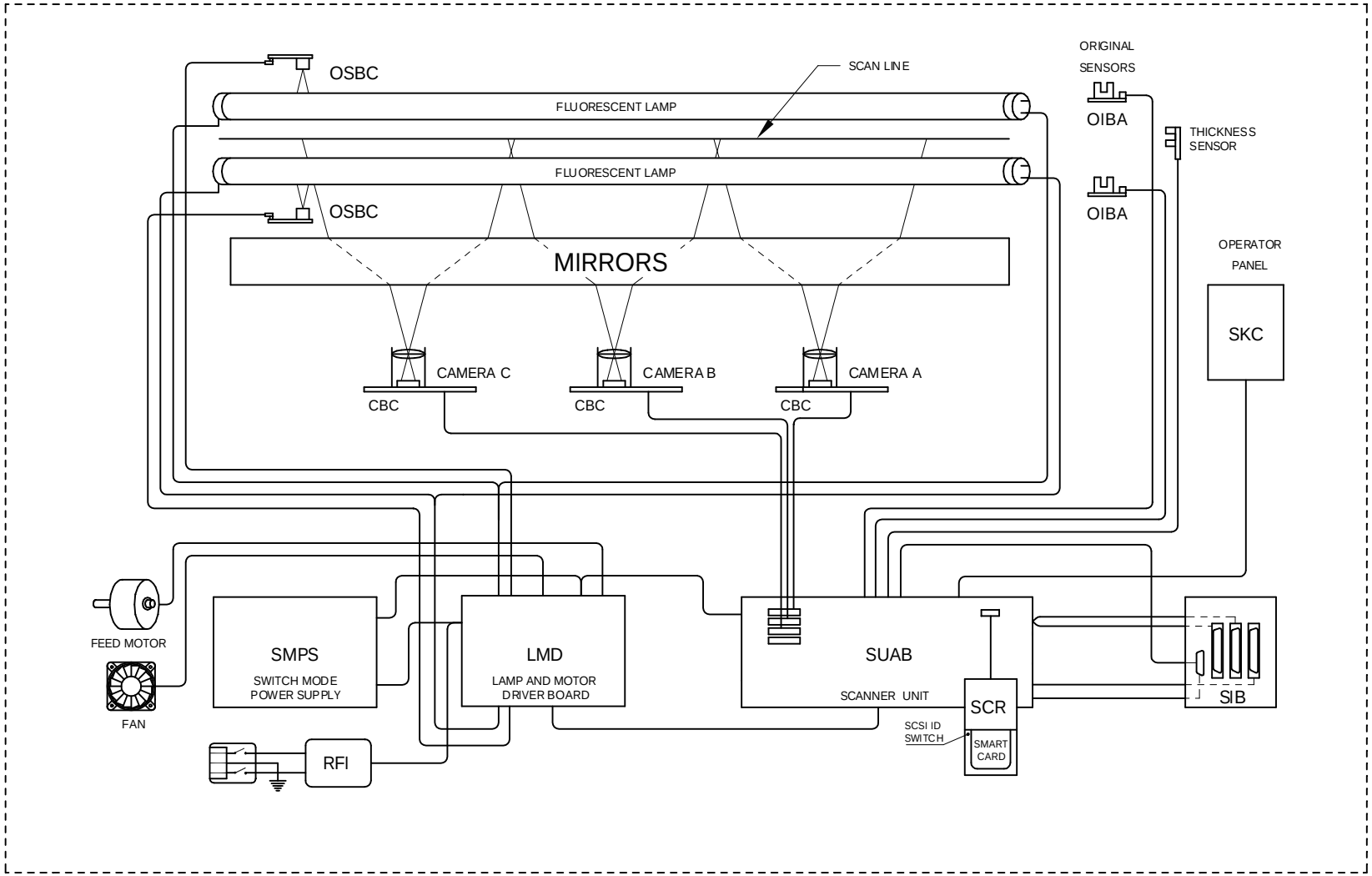


Fig. 2-1 FSC x040 CHROMA Block Diagram

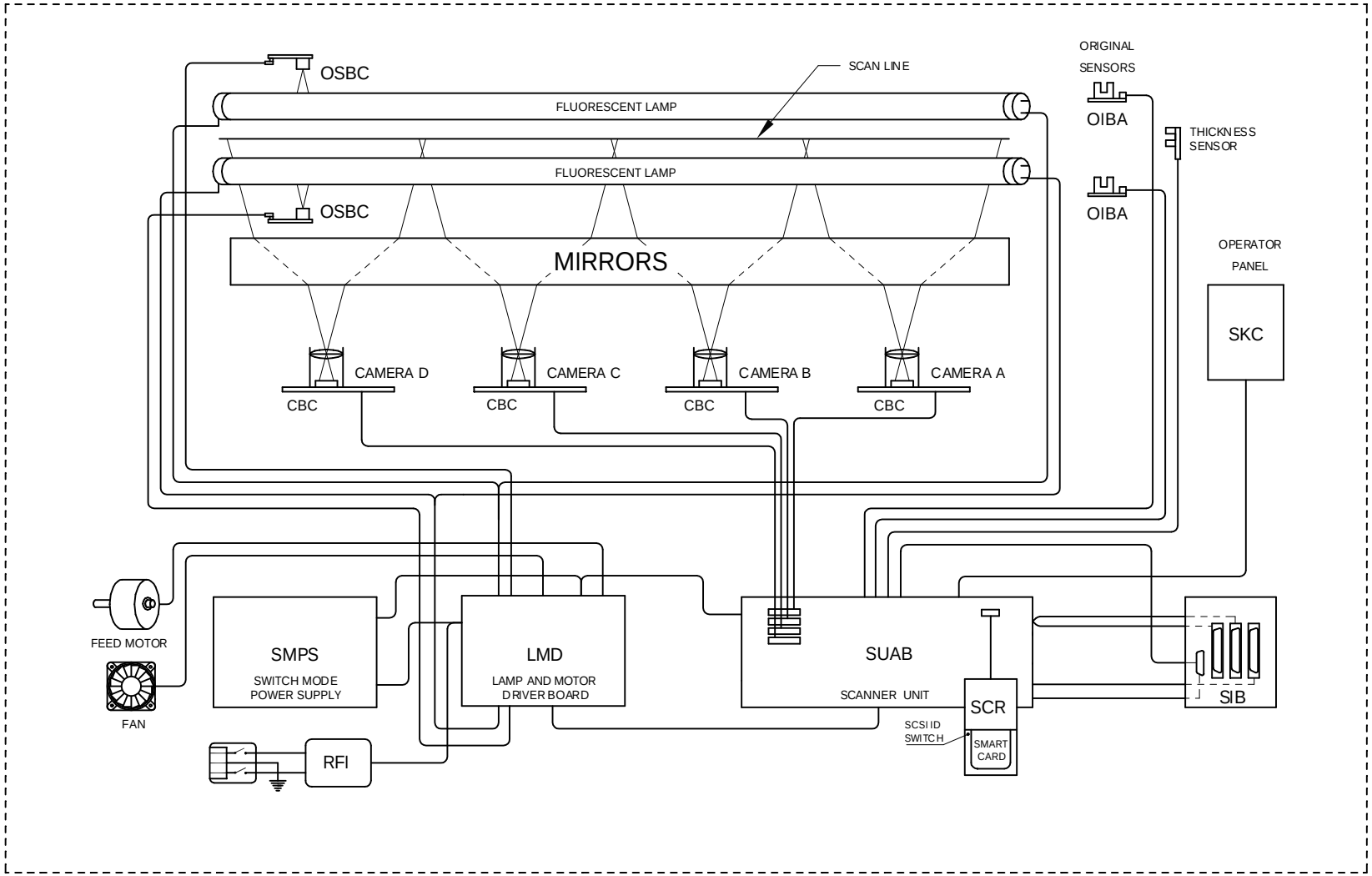


Fig. 2-2 FSC x050 MAGNUM Block Diagram

2.2 FSS225x PANORAMA and CRYSTAL 40 Monochrome Scanners

The Block Diagram is shown in:

Fig. 2-3 FSS 225x PANORAMA, CRYSTAL 40 Block Diagram, page 15

The functionality of the PANORAMA and CRYSTAL Wide Format Monochrome Scanners, such as

- max. image resolution
- scanning speed
- digital image processing

depends on a Smart Card located behind the Model Streamer on the Front Profile of the scanner.

The PANORAMA and CRYSTAL scanner range consists of:

Generic Model	Product Name (Smart Card)	Scan Width (inches)	No. of Cameras	Optical Resolution (dpi)	Level of Functionality (Smart Card)
FC67A	FSS2250 PANORAMA	50	3	461	Basic (BASIC)
-	FSS2251 PANORAMA	50	3	461	High (PLUS)
FD67A	CRYSTAL 40	40	3	461	Basic (BASIC)
-	CRYSTAL 40 PLUS	40	3	461	High (PLUS)

The scan-area is illuminated by two white fluorescent lamps. The light output from the lamps is stabilized by feedback to the lamp power supply board (LMD).
Each CCD-Camera in the scanner contains one 7926 pixel CCD. The output signals from the CCDs are Light Profile Corrected at pixel level.

In order to stitch (bring together) scanlines from adjacent cameras, the fields of vision of the CCD-Cameras overlap slightly and a thin, black wire placed within the overlapped fields of vision marks the virtual end, respectively start, of adjacent scanlines.
The scanlines from the individual cameras are mechanically aligned in the vertical direction.

All scanning and image processing functions are contained on only two boards, the Camera Board (CBB) and the Scanner Unit Board (SUAC).

The scanner has one dual SCSI Port (SCAN SCSI 0-A and 0-B) used for normal Scan-to-File operations, and one single SCSI Port (COPY SCAN 1) used when a separate Copy-PC configuration is attached simultaneously with a Scan-to-File PC.
The interface is SCSI-3 with a transfer rate up to 20 MB/s.

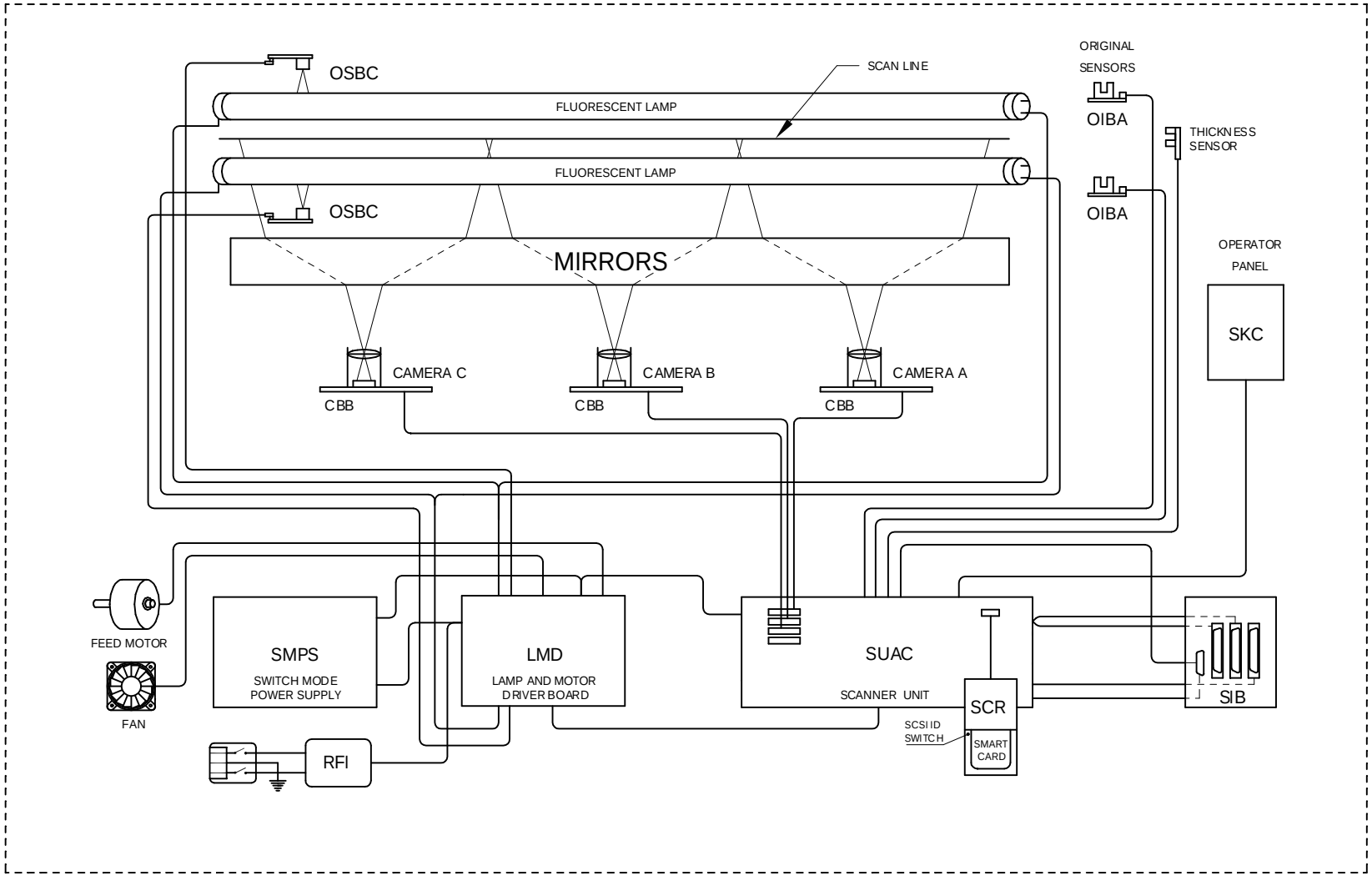


Fig. 2-3 FSS 225x PANORAMA, CRYSTAL 40 Block Diagram

2.3 SMPS, Switch Mode Power Supply

The SMPS is a standard Switched Mode Power Supply containing:

Primary Fuse
Rectifiers and Filter Capacitors
Switch Mode Voltage Regulators

Voltage Outputs

+5.3 V which is used as supply for the LMD-, SUA-, and CBC- Boards
+12 V which is used as supply for the LMD-, SUA-, and CBC- Boards
-12 V which is used on the LMD-Board
+24 V which is used on the LMD-Board (Stepper Motor supply)

2.4 LMD, Motor and Lamp Driver Board

The LMD Block Diagram is shown in Fig. 2-4, page 17.

The LMD-Board contains the following functional circuits:

Interconnection between Power Inlet and SMPS
Primary fuse for Lamp Driver
Rectifiers and Filter Capacitors for the Lamp Drivers
Lamp Driver Control Circuits
Stepper-Motor Control and Drive Circuit
Automatic Voltage Switching between 100-120 V and 220-240 V

2.4.1 Lamp Driver

Each of the two Lamp Driver Circuits uses a SMPS Controller to drive the Power FETs which drive the lamps.
The light outputs from the two lamps are stabilized by feedback from two OSB-Boards that are located close to the lamps at the 'Power Inlet End' of the scanner.

2.4.2 Stepper Motor Control

The stepper motor is driven in switched, current controlled mode. Each winding of the two-phase bipolar stepper motor is driven by a full-bridge driver. The drive signals for the stepper motor are generated by two EPROMs which are controlled by an up-down counter. The digital output from the EPROMs are converted to analog signals which control the stepper motor phase currents. The controller can operate with up to 64 micro-steps. The number of micro-steps and the direction of rotation are controlled by the processor on the SUA-Board.

2.4.3 Automatic Voltage Switching

As the scanner is switched ON, the LMD-Board adapts automatically to either the low supply voltage range, 100-120 V, or the high supply voltage range, 220-240 V according to the actual mains voltage.
The Automatic Voltage Switching circuit consists of a triac and a controller circuit.

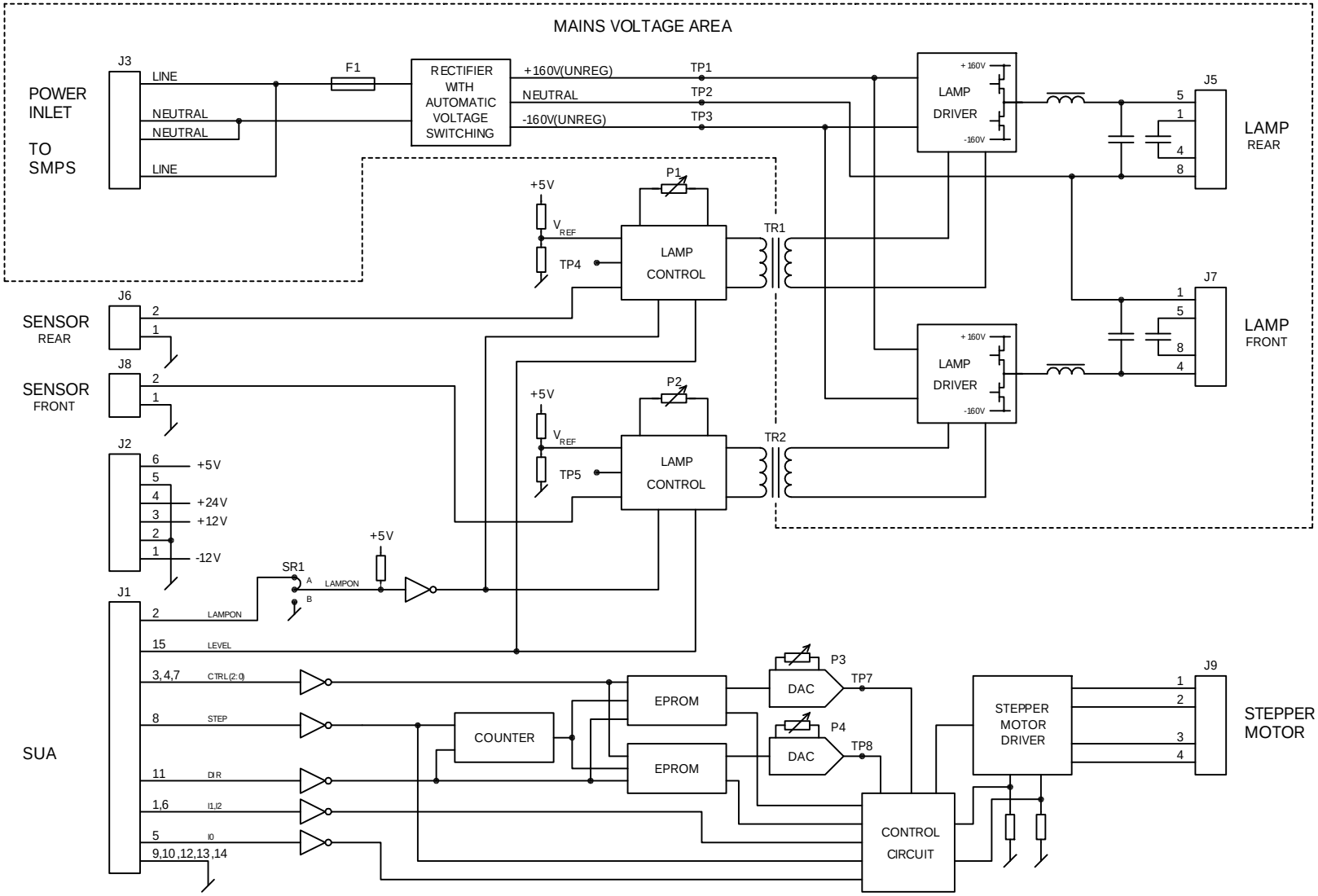


Fig. 2-4 LMD Block Diagram

2.5 CBC, Camera Board (MAGNUM and CHROMA only)

The CBC Block Diagram is shown in Fig. 2-5, page 21.

The CBC-Board contains:

Color CCD-Chip, 5363 x 3 pixels
CDS, Correlated Double Sampling Circuits
Two Wolfson Scanner Processors (one for odd and one for even numbered pixels)
AMP RAM (Light Profile Correction)
Line RAM (delays for Color Alignment and RGB filters)
FPGA, controlling the Wolfson processors and interface to the SUA
Flat cable connector for image data, clock signals and supply voltages

2.5.1 Color CCD Chip

The CCD pixels are arranged in three lines, one for each of the colors Red, Green, and Blue. The spacing between the lines on the CCD chip is 64 µm corresponding to 8 scanlines at optical resolution.

The lines are covered by color filters and arranged as follows:

Upper line on the CCD:	Red
Center line on the CCD:	Green
Lower line on the CCD:	Blue

As the image is mirrored by the lens, the Blue line becomes the upper line when referred to the original.

The outputs from the CCD are buffered by three emitter followers and next Correlated Double Sampled to correct for thermal black-current in the CCDs.

2.5.2 Wolfson Scanner Processor

The outputs from the CDS are fed into the two Wolfson Scanner Processors (one for odd and one for even numbered pixels) which contains the following signal conditioning functions:

2.5.2.1 Gain and Offset Control

The level and offset of the RGB signals may vary from camera to camera, and each channel has Gain and Offset control circuits to adjust the signal level and the signal offset to match the input-signal range of the following AD-Converter.
The gain and offset parameters are adjusted by running Basic Calibration or WIDEimage, Calibrate Scanner and then they are stored in the Flash Memory on the SUA-Board.

2.5.2.2 AD-Converters

The AD-Converters operate on the multiplexed analog RGB signals and convert these into 12-bit digital signals.

2.5.2.3 Light Profile Correction

The digitized image signals are passed through a Multiplier to compensate for Photo Response Non Uniformity (PRNU) and uneven light distribution along the scanline, and to provide a pre-defined White-Signal level for the later signal processing on the SUA-Board.
The Light Profile Correction of the scanner is based on two Light Profiles obtained during Basic Calibration or WIDEimage, Calibrate Scanner:

- High resolution Light Profile of Basic-Calibration Sheet (BCS, stored in Flash Memory on the SUA-Board)
- Filtered Light Profile of the White Background Plate in the scanner (WBP, stored in Flash Memory on the SUA-Board)

and one Light Profile which is automatically being updated whenever the scanner is idle **and** the Original Guide Plate is full down in Normal position:

- Filtered Light Profile of the White Background Plate of the scanner (UPD, stored in RAM on the CBC-Board)

The Light Profile Correction uses the high resolution Light Profile to correct for PRNU and to provide a pre-defined White-Signal level. The difference between the two filtered Light Profiles is used to correct for changes in light level and light distribution that may have happened after the last Basic Calibration or WIDEimage, Calibrate Scanner.

2.5.3 Automatic Updating of Light Profile Correction and Stitching

The automatic updating of the Light Profile mentioned above as well as Stitching (see Sec. 5.1, page 94) is suspended in the following cases:

Power On Self Test:

- If the scanner is switched ON with the Original Guide Plate placed in one of the Extended Media Thickness positions.

- If the scanner is switched ON with media in the scan-area (detected by the Original Entry and Exit Sensors), the feed motor is started in an attempt to remove the media from the scan-area.
  If the attempt to clear the scan-area fails, the update of the Light Profile is suspended.

When the condition for suspension has been detected, the WAIT LED on the Operator Panel begins to blink to alert the user that the automatic Light Profile Correction has been suspended. After the cause of the suspension has been rectified, the WAIT LED stays ON continuously until the Light Profile Correction has been completed successfully.

During Operation:

- Whenever the Original Guide Plate is placed in one of its Extended Thickness positions.

- When scanning continuously (f. ex. batch scanning or prescanning).

The duration of the suspension of the automatic Light Profile Correction is monitored by an update-timer (the timing of which depends on the time elapsed since power on).
When the update-timer times out, the WAIT LED on the Operator Panel begins to blink to alert the user that the automatic Light Profile Correction has been suspended. After the cause of the suspension has been rectified, the WAIT LED stays ON continuously until the Light Profile Correction has been completed successfully.

2.5.4 Line RAM

The physical spacing between the three lines of pixels (R, G and B) on the CCD corresponds to 8 scanlines at the optical resolution of the scanner.

The RGB data supplied to the Colorspace Converter on the SUA-Board must refer to the same physical location on the original, that is, Blue must be delayed 16, and Green 8 scanlines to coincide with Red at optical resolution.

When scanning at DPIs for which the physical offset between the pixel arrays (referred to the original) does not correspond to an integer number of scanlines, interpolated color data are used as input for the Colorspace Converter. As for example, at 425 DPI, Blue must be delayed 17 and Green 8½ (interpolation between scanline N–8 and scanline N–9) scanlines.

That is, in the MAGNUM scanner which has an optical resolution of 400 DPI:

	At 400 DPI	**At 425 DPI**
the Blue component of scanline no.	N–16	N–17
the Green component of scanline no.	N–8	N–8½
the Red component of scanline no.	N	N

refers to the same physical location on the original drawing.

The required delays are obtained by temporarily storing the scanlines in large RAM line buffers and the interpolation between the scanlines is done by the FPGA circuit on the CBC-Board.

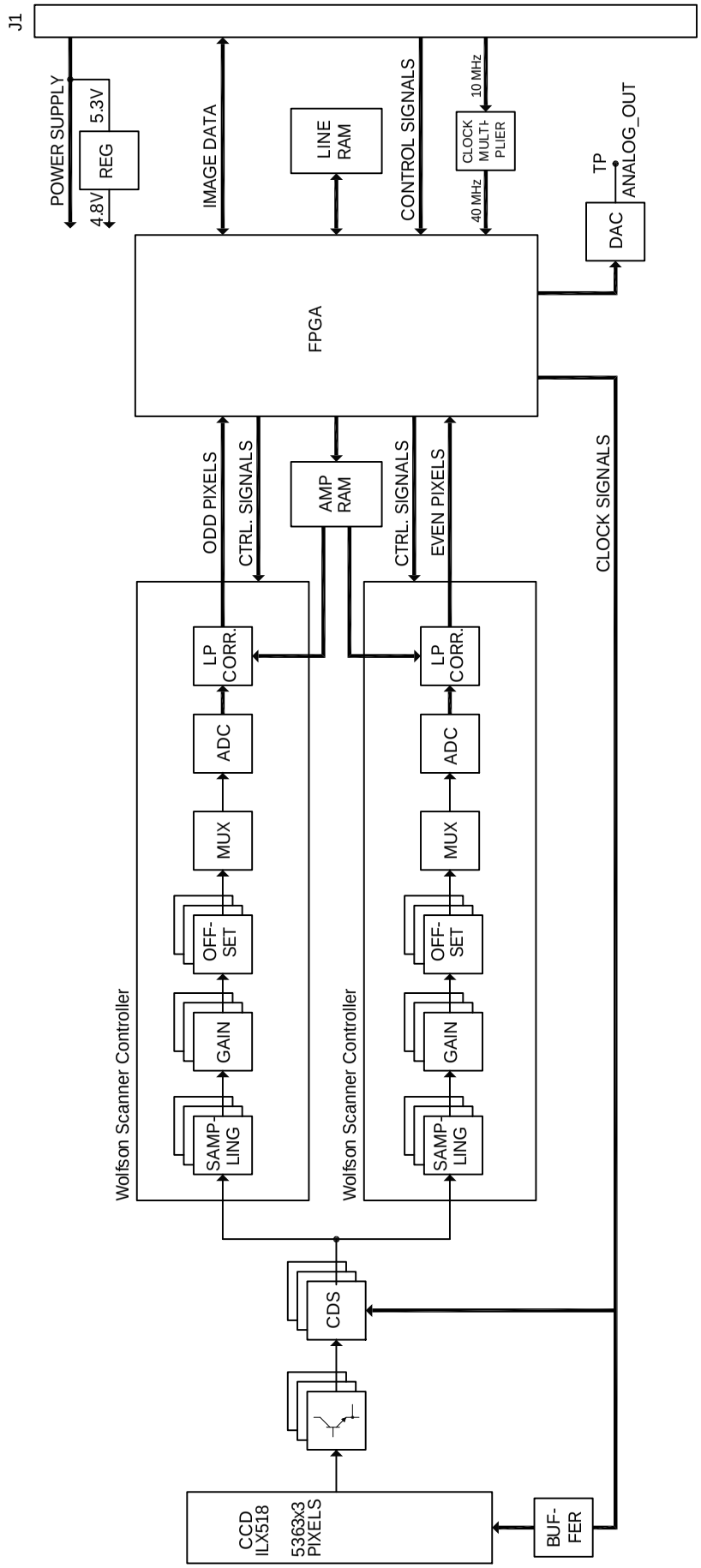


Fig. 2-5 CBC Block Diagram

2.6 CBB, Camera Board (PANORAMA and CRYSTAL only)

The CBB Block Diagram is shown in Fig. 2-6, page 24.

The CBB-Board contains:

Monochrome CCD-Chip, 7926 pixels
Two Wolfson Scanner Processors (one for odd and one for even numbered pixels)
AMP RAM (Light Profile Correction)
Line RAM (Delay and Gray filter)
FPGA, controlling the Wolfson processors and interface to the SUA
Flat cable connector for image data, clock signals and supply voltages

2.6.1 Wolfson Scanner Processor

The outputs from the differential amplifiers are fed into the two Wolfson Scanner Processors (one for odd and one for even numbered pixels) which contains the following signal conditioning functions:

2.6.1.1 Gain and Offset Control

The level and offset of the video signals may vary from camera to camera, and each channel has Gain and Offset control circuits to adjust the signal level and the signal offset to match the input-signal range of the following AD-Converter.
The gain and offset parameters are adjusted by running Basic Calibration or WIDEimage, Calibrate Scanner and then they are stored in the Flash Memory on the SUA-Board.

2.6.1.2 AD-Converters

The AD-Converters operate on the analog video signals and convert these into 12-bit digital signals.

2.6.1.3 Light Profile Correction

The digitized image signals are passed through a Multiplier to compensate for Photo Response Non Uniformity (PRNU) and uneven light distribution along the scanline, and to provide a pre-defined White-Signal level for the later signal processing on the SUA-Board.
The Light Profile Correction of the scanner is based on two Light Profiles obtained during Basic Calibration or WIDEimage, Calibrate Scanner:

- High resolution Light Profile of Basic-Calibration Sheet (BCS, stored in Flash Memory on the SUA-Board)
- Filtered Light Profile of the White Background Plate in the scanner (WBP, stored in Flash Memory on the SUA-Board)

and one Light Profile which is automatically being updated whenever the scanner is idle **and** the Original Guide Plate is full down in Normal position:

- Filtered Light Profile of the White Background Plate of the scanner (UPD, stored in RAM on the CBB-Board)

The Light Profile Correction uses the high resolution Light Profile to correct for PRNU and to provide a pre-defined White-Signal level. The difference between the two filtered Light Profiles is used to correct for changes in light level and light distribution that may have happened after the last Basic Calibration or WIDEimage, Calibrate Scanner.

2.6.2 Automatic Updating of Light Profile Correction and Stitching

The automatic updating of the Light Profile mentioned above as well as Stitching (see Sec. 5.1, page 94) is suspended in the following cases:

Power On Self Test:

- If the scanner is switched ON with the Original Guide Plate placed in one of the Extended Media Thickness positions.

- If the scanner is switched ON with media in the scan-area (detected by the Original Entry and Exit Sensors), the feed motor is started in an attempt to remove the media from the scan-area.
  If the attempt to clear the scan-area fails, the update of the Light Profile is suspended.

When the condition for suspension has been detected, the WAIT LED on the Operator Panel begins to blink to alert the user that the automatic Light Profile Correction has been suspended. After the cause of the suspension has been rectified, the WAIT LED stays ON continuously until the Light Profile Correction has been completed successfully.

During Operation:

- Whenever the Original Guide Plate is placed in one of its Extended Thickness positions.

- When scanning continuously (f. ex. batch scanning or prescanning).

The duration of the suspension of the automatic Light Profile Correction is monitored by an update-timer (the timing of which depends on the time elapsed since power on).
When the update-timer times out, the WAIT LED on the Operator Panel begins to blink to alert the user that the automatic Light Profile Correction has been suspended. After the cause of the suspension has been rectified, the WAIT LED stays ON continuously until the Light Profile Correction has been completed successfully.

2.6.3 Line RAM

The Line RAM is used for storage of scanlines for delays and gray filter.

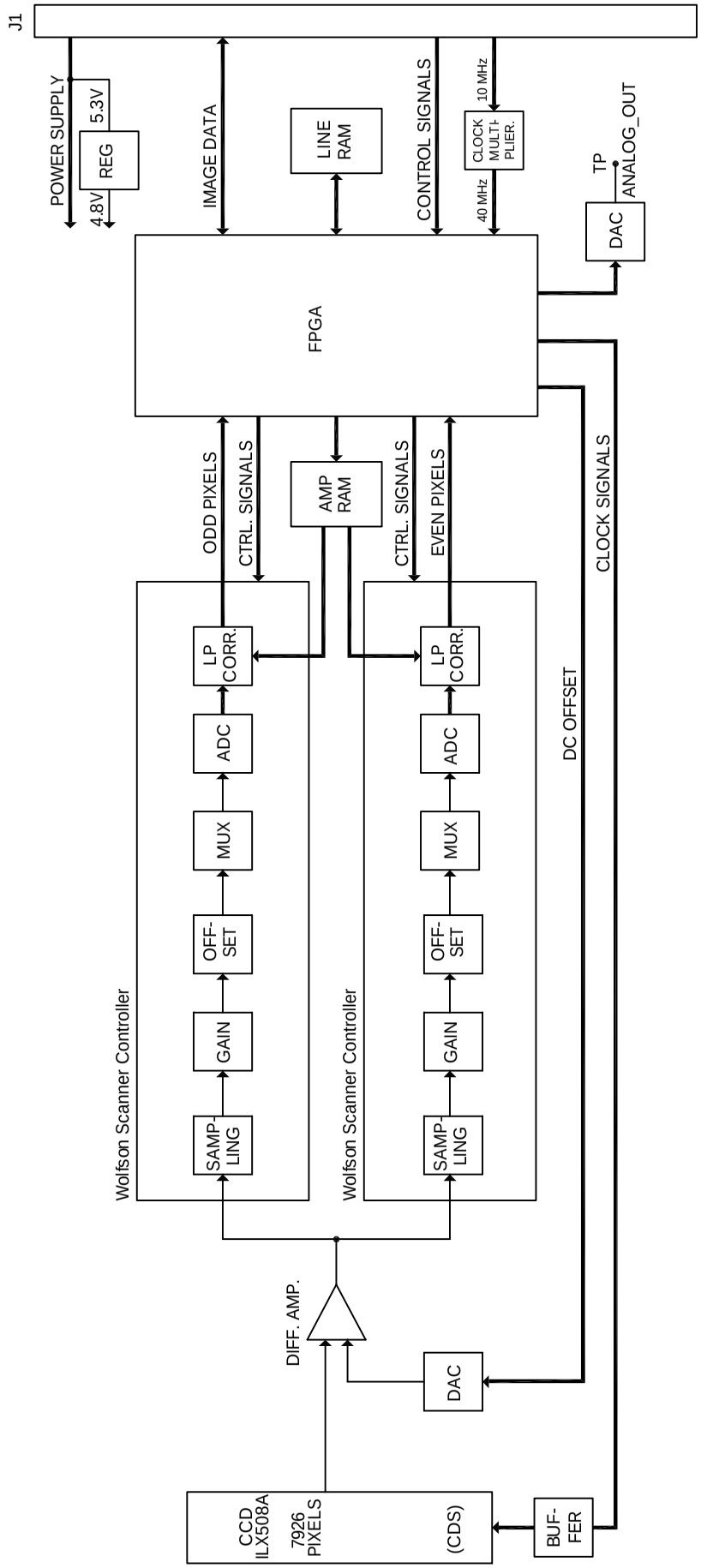


Fig. 2-6 CBB Block Diagram

2.7 SUA, Scanner Unit

The SUA Block Diagram is shown in Fig. 2-7, page 28.

The SUA-Board contains the following modules:

386EX Micro Processor
Colorspace Converter (MAGNUM and CHROMA only)
Gamma RAM
Indexed Color RAM (MAGNUM and CHROMA only)
Area Diffusion Logic / Adaptive Image Module
Dual SCSI Controllers
Flash Memory for Scanner Parameters, firmware, e.t.c.

2.7.1 Processor Module

The major functions of the Processor Module are:

- Communication with the host computer via the SCSI controller.
- To process and automatically update the data for the Light Profile Correction.
- To Stitch scanlines from adjacent cameras and automatically update the Stitching whenever the scanner is idle.
- To control the CCD Exposure Time, Stepper-Motor speed, DPI-scaling, swapping of data buffers when full, temporarily halting the scanner to give a slow host computer time to process the image data, etc.
- To run a Power-On Self Test of various circuits on the SUA- and CBC/CBB-Boards at power-on.
- To run the Scanner Tests when the scanner is in Test Mode.

The SUA-Board is booted from a BIOS sector in Flash Memory.
The Processor program and the FPGA firmware are stored in Flash Memory, and the FPGAs on the SUA- and CBC/CBB-Boards are uploaded at power-on.
An area of the Flash Memory is used as a non-volatile storage for Scanner ID and adjustment parameters.
The processor program (the executable) and the FPGA firmware can be downloaded to the Flash Memory through the SCSI interface. The download program is included on the firmware disk.

2.7.2 Data Acquisition Module

The image data (12bit size, Optical Resolution) from the CBC/CBB-Boards are entered into the Data Acquisition Module (FPGA01) on the SUA-Board. The major functions of the Data Acquisition Module are:

- Interpolate image data to 2 x Optical Resolution
- Stitch scanlines from adjacent cameras.
- Scale DPI down to the wanted Image Resolution by discarding the required number of pixels.

The Stitched and Scaled image signal is passed on to the following modules:

2.7.2.1 Linearity Module (MAGNUM and CHROMA only)

The Linearity Module is reserved for future use, and the image signal passes unaltered.

2.7.2.2 Colorspace Converter (MAGNUM and CHROMA only)

The basic RGB signals from the CBCs are converted to an international standard (ANSI IT8) by the Colorspace Converter. The Colorspace Converter consists of a 3 x 3 matrix multiplier. The nine matrix coefficients for the converter are determined by scanning the ANSI IT8 Color Calibration Sheet using the Calibrate Scanner option of WIDEimage. The matrix coefficients are stored in Flash Memory on the SUA-Board.

2.7.2.3 Gamma Correction

Gamma correction is a contrast enhancing feature. The Gamma correction is performed in lookup tables.

2.7.2.4 Indexed Color RAM (MAGNUM and CHROMA only)

When using Indexed Color Mode, the Index RAM maps the 16.7 million colors of the 24-bit RGB into a relatively small (say 256) number of discrete colors. An index number of the color of each triple-pixel is transmitted to the host computer. When retrieving the image, a lookup table uses the index to reproduce the Red, Green, and Blue components of the mapped color signal.

2.7.2.5 Vertical Interpolator

Reserved for future use.

2.7.2.6 Area Diffusion Logic / Adaptive Threshold

Most of the image enhancing functions found in WIDEimage under Scan Setup / Modes:

B/W Threshold
B/W Adaptive
B/W Copy ADL+
B/W Photo ADL+
etc.

are contained in this module. The processed data are transferred to the Double Buffer Module.

2.7.3 Double Buffer Module

The Double Buffer Module contains two data buffers of which one is used as an ‘input’ buffer while the other is used as an ‘output’ buffer.
The image data from the Signal Processing Module is written to the ‘input’ buffer while the data in the ‘output’ buffer is being read by the SCSI Controller. When all data in the ‘output’ buffer have been read by the SCSI Controller and transmitted to the host computer, the functions of the buffers are reversed.
If the ‘input’ buffer is filled up before the ‘output’ buffer has been emptied, the processor temporarily halts the stepper motor to give a slow host computer sufficient time to fetch and store the image data.

2.7.4 Stepper Motor Pulse Generator

The stepper motor is driven in micro-stepping mode, and the stepper motor clock pulses are generated by an 386EX internal clock generator on the SUA-Board.
A 32 bit position counter is used to keep track of the position of the original during scanning. This counter can be read from the processor.
If the 'input' buffer is filled up before the 'output' buffer has been emptied, the processor temporarily halts the step pulses in order to give a slow host computer sufficient time to fetch and store the image data.

2.7.5 SCSI Interface

The SCSI Interface consists of two SCSI Controllers. One is connected to the two SCSI connectors marked SCAN SCSI 0-A and SCAN SCSI 0-B, and the other to the one connector marked COPY SCSI 1.
The COPY SCSI connector is only used when a separate Copy PC configuration is attached simultaneously with the Scan-to-File PC (SCAN SCSI).
The SCSI ID, which is common for the two SCSI controllers, is set on a DIP switch located on the Smart Card Reader.

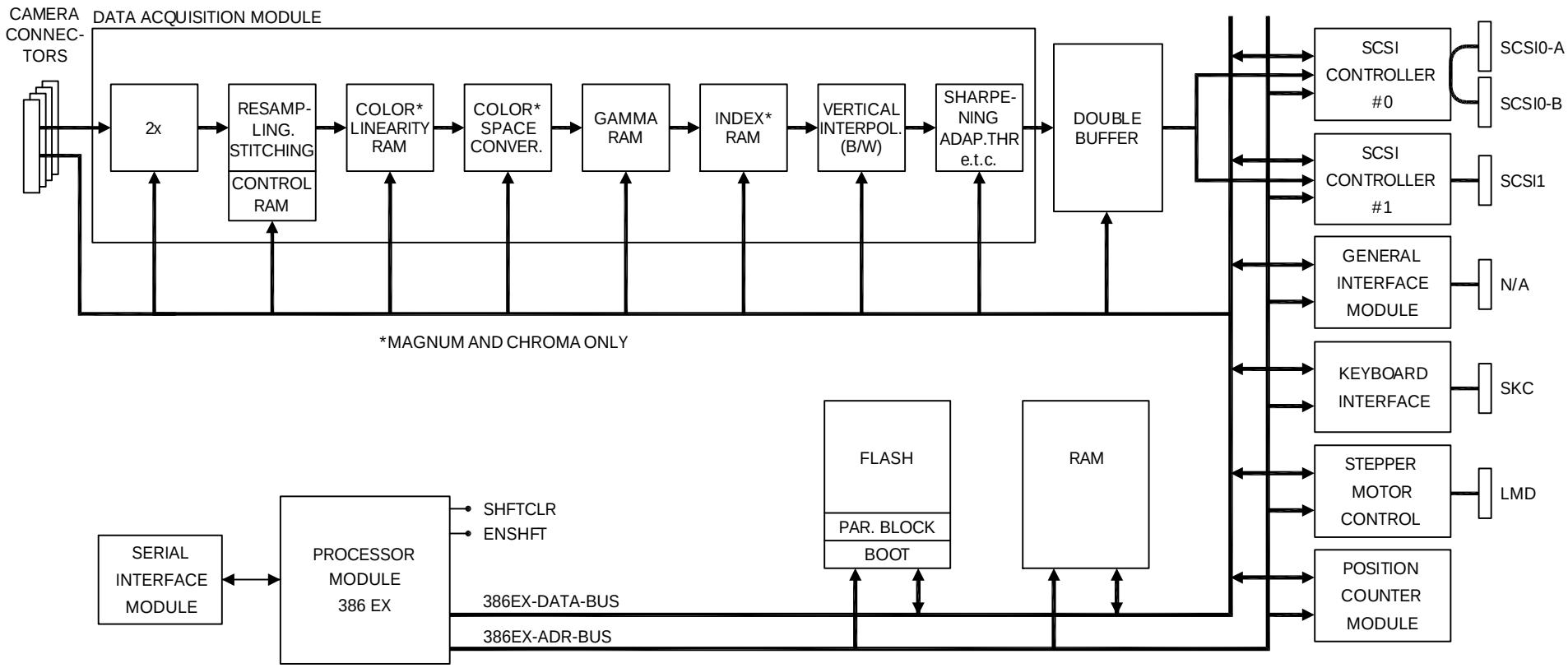


Fig. 2-7 SUA Block Diagram

2.8 SCR, Smart Card Reader

The SCR Block Diagram is shown in Fig. 2-8, page 30.

The Smart Card Reader is located in a small drawer marked PUSH behind the Model Streamer, and contains :

Connector for the Smart Card
DIP Switch for SCSI ID

The setting of the SCSI ID Switch is shown in Section 3.9.4, page 52.
When a Smart Card is inserted, an on board switch turns LED1 ON.

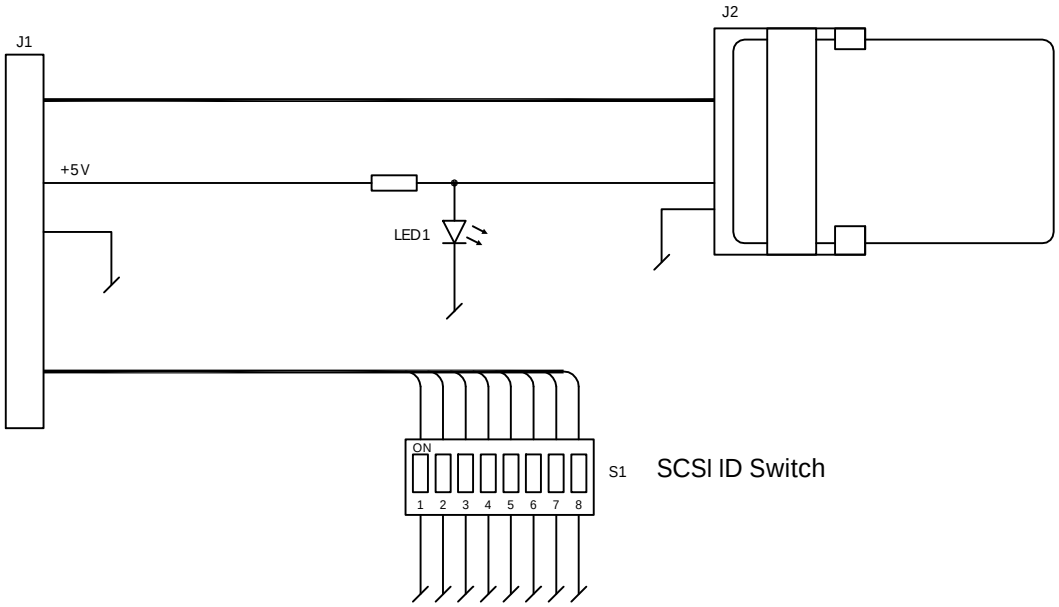


Fig. 2-8 SCR Block Diagram

2.9 SKC, Operator Panel

The SKC Block Diagram is shown in Fig. 2-9, page 32.

The SKC Operator Panel contains:

Two Push Buttons:	Forward	
	Stop / Reverse	
Four Indicators:	Ready (in push button):	Green
	Power:	Yellow
	Wait:	Red
	Diagnostic:	Red
Scanner ID Switch:	Used for scanner type identification	

The setting of the Scanner ID Switch, S1, is shown in Section 3.8.4, page 50.

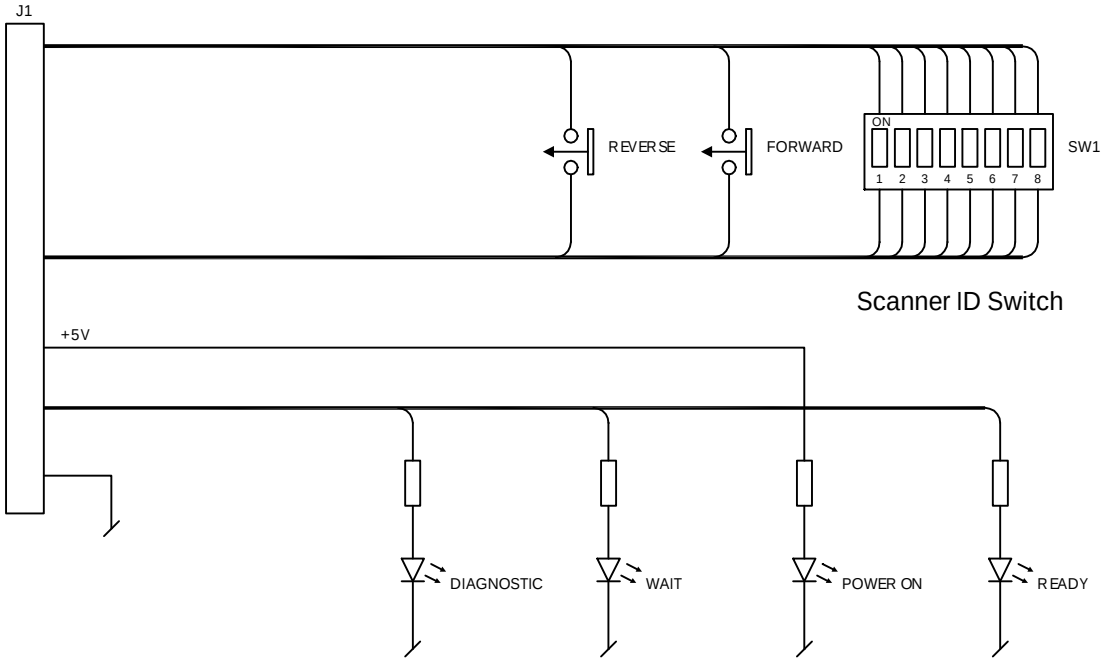


Fig. 2-9 SKC Block Diagram

3. Electrical Check and Adjustments

Required Test Equipment:

2-Channel Oscilloscope, BW ≥ 20 MHz, R_i > 10 MOhm
Multimeter, R_i > 10 MOhm

A scanner test program, SCANtest 4, is available to facilitate check and adjustment. SCANtest 4 is described in Chapter 11, page 156.

3.1 Marking Codes for Circuit Boards and Programmed Devices

All circuit boards are identified by a 4-letter code, where the fourth letter is designating a specific variant of the board. The board identification code is followed by a board revision number.

The marking of all new printed circuit boards may be exemplified by the marking of the SUA-Board:

SUAB02

which designates SUA-Board, variant **B**, revision **2**.

The marking code of the old OIBA and OSBC are a little different, for example:

OIBA-1.0

which designates OIB-Board, variant **A**, revision **1.0**.

The revision number is updated only if the functionality of the board has been changed. Updated boards will always be backwards compatible.

Programmed components, like EPROMs, PALs, etc., are marked with a 3-letter or 4-letter identification code, depending on whether the component is basic or variant specific. For example, the component marking:

SUA.003-1

identifies the Master Address Decoder used on all variants of the SUA-Board. **003** is a component specific number and **1** is the firmware revision number.
The variant designation (and part number) of the circuit boards used for a particular scanner model can be found in the Spare Part List included in the Technical Service Manual.

3.2 Downloading Scanner Firmware

The scanner firmware is stored in Flash Memory on the SUA-Board.

The scanner firmware is distributed on a disk, which also contains a download program.

The firmware can be downloaded to the scanner through the SCSI port, please see *readme.txt* on the firmware disk for download instructions.

The download program:

CtxPrgm5.exe

runs under Windows 95/98/NT.

The download program reads the Download Control Switches, SW4 and SW5, on the SUA-Board to check if the actual firmware and the SUA hardware are compatible.
The Download Control Switches are factory set, and the setting must not be changed.

If the scanner does not go into Boot Mode when the download program is started, the scanner can be forced into Boot Mode by turning it OFF, setting SW7 on the SCSI ID-Switch to ON (see page 53), and turn the scanner back ON. The scanner will now be in Boot Mode and new firmware can be downloaded as described above. When the new firmware has been successfully downloaded, turn the scanner OFF, set SW7 back to OFF, and turn the scanner ON for normal operation.

If the SCSI communication fails during download, turn the scanner and the PC OFF and then back ON to re-establish the SCSI communication.

3.2.1 Erase and Restore Parameter Blocks

The following two options may be found on the pull-down menu of CtxPrgm5.exe:

- Erase parameter blocks
- Restore parameter blocks

'Erase parameter blocks' erases the parameter blocks (Stitching, Color Calibration, Basic Calibration, etc.) in Flash Memory on the SUA-Board and save the parameter blocks in the file 'backup.pmb' located in the directory pointed to by the SET TEMP environment variable. The file, backup.pmb, may be useful for diagnostic purposes.

'Restore parameter blocks' restores the parameter blocks from backup.pmb.

3.3 Check and Adjustment of the Switch Mode Power Supply, SMPS

All test points referred to below are shown in Fig. 3-1, page 37.
All DC voltages are measured relative to P2, pin 4, 5, 6, 7 (GND).

3.3.1 AC Voltages

CAUTION:
The connector P1 is connected directly to the line voltage and constitute a risk of electric shock, or injury to persons.

P1(L) – P1(N)	Mains Supply Voltage

3.3.2 DC Voltages

P2, pin 1, 2, 3	+5.3 V +0/-0.1 V
P2, pin 4, 5, 6, 7	GND
P2, pin 8, 9	+12 V ± 0.5 V
P2, pin 11	-12 V ± 0.5 V
P2, pin 13	+24 V ± 1 V

3.3.3 Adjustments

The output voltages of the SMPS are all factory set and should normally **not** be adjusted.

The only non-standard voltage is the "5 V" output voltage. The "5 V" output voltage should be no more than 5.3 V measured between GND and P2, pin 1,2,3 on the SMPS, and no less than 5.1 V measured between GND and C46, bottom on the CBC/CBB-Board.

If the voltage is not within these limits, it may be adjusted by potentiometer VR1 on the small vertical board in the SMPS. It is very difficult to make this adjustment because VR1 is located under the protection cover.

To make the adjustment:

- Turn off mains supply voltage.
- Loosen the SMPS, remove the protection cover and move the SMPS partly out of the scanner to get access to VR1
- Make sure that none of the circuits on the exposed bottom side of the SMPS short circuit to scanner chassis.

CAUTION:
Moving the SMPS away from its normal position and removing the protection cover expose components and circuits on the bottom side of the SMPS, which are connected directly to the line voltage and constitute a risk of electric shock, or injury to persons.

- Switch power ON
- Adjust VR1

3.3.4 Fuses

The type and rating of the fuse on the SMPS is:

F1: F4A type IEC 127-2/2, UL Rec.

CAUTION:
For continued protection against risk of fire, replace only with same type and rating of fuse.

3.3.5 Markings

No marking.

3.3.6 Jumper Settings

No jumpers

3.3.7 Hints

+5.3 V, is used as general “5 V” supply for electronics on other board, and as input voltage for the 4.85 V linear voltage regulator on the CBC/CBB-Board.

+12 V, -12 V are used for electronics on other boards.

+24 V is used for the Stepper Motor Driver.

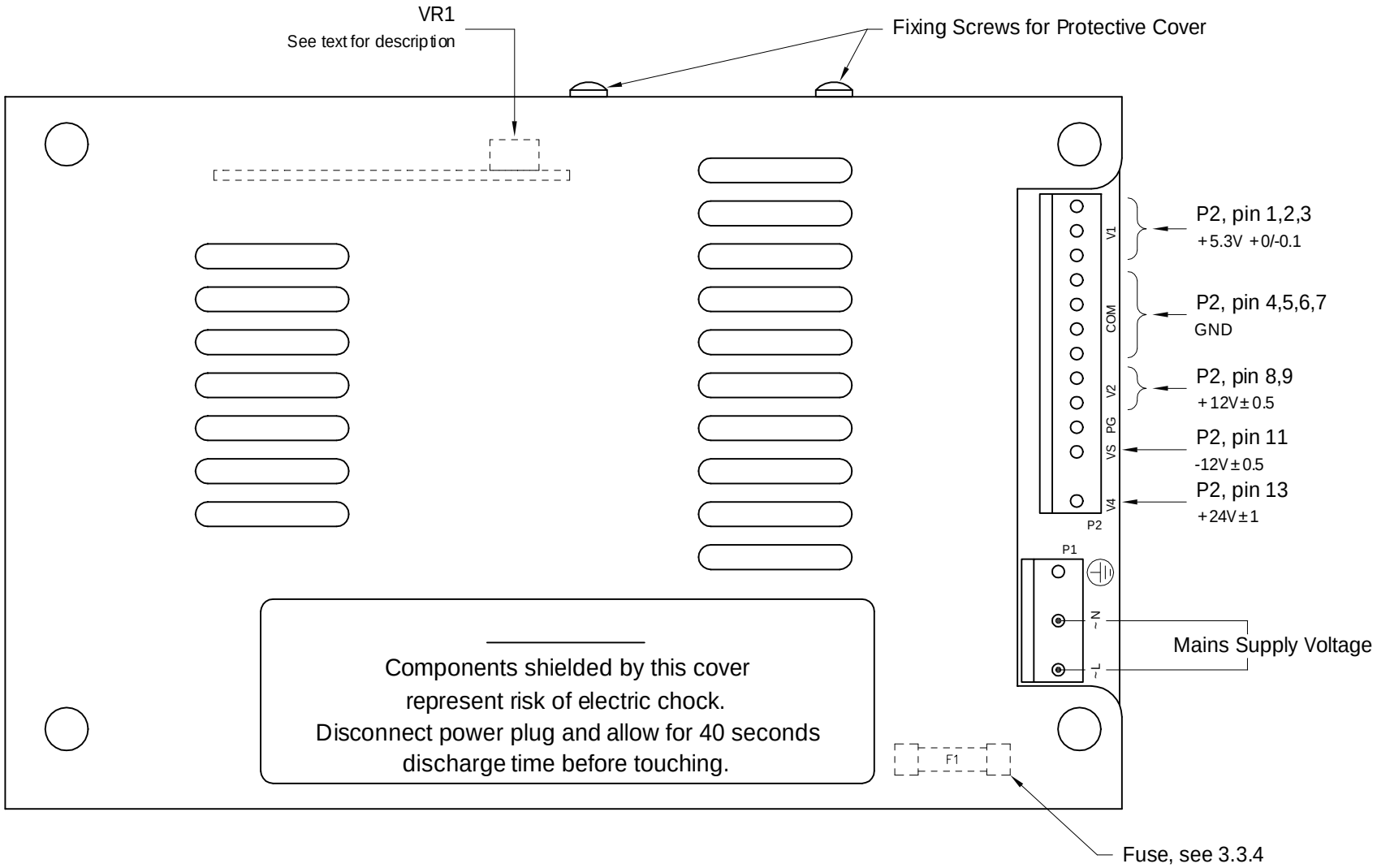


Fig. 3-1 SMPS Test Points

3.4 Check and Adjustment of Lamp and Motor Driver Board, LMD

All test points referred to below are shown in Fig. 3-2, page 41.
All DC voltages are measured relative to test point GND.

CAUTION:
The connectors J3, J5, J7 and all the components on the left half of the board are connected directly to the line voltage and constitute a risk of electric shock, or injury to persons.

3.4.1 DC Voltages

J2, pin1,2 - GND	+5.3 V +0/-0.2 V
J2, pin3,4,5	GND
J2, pin6 - GND	+12 V ± 0.5 V
J2, pin7 - GND	−12 V ± 0.5 V
J2, pin8 - GND	+24 V ± 1 V
TP1 - TP2 *	+160 V ± 20 V
TP2 - TP3 *	−160 V ± 20 V

* Caution: These test points are connected directly to the line voltage.
The ±160 V ± 20 V are no-load voltage (SCANtest4, Test 5 (Lamp Test) or disconnect cable from connector J1 on the LMD- Board)

3.4.2 Lamp-Driver Adjustment

The lamps must have been ON for at least 5 minutes (preferably longer) before adjustment. The light output from the lamps are stabilized by feedback from the photo diodes on the OSB-Boards. Because of the wide input voltage range which the lamp driver must be able to accept, and to make sure that the feedback circuit is able to compensate for changes in line voltage, lamp temperature (the output from the lamp decreases with increasing temperature) and aging of the lamp, the voltage on TP4 and TP5 must be adjusted in accordance with the values in the table below.

If Mains Voltage is:	**Adjust Voltage on TP4 / TP5 to:** (±100 mV)
85 V_{AC}	2500 mV
95 V_{AC}	2000 mV
105 V_{AC}	1500 mV
115 V_{AC}	1100 mV
125 V_{AC}	700 mV
180 V_{AC}	1900 mV
190 V_{AC}	1600 mV
200 V_{AC}	1350 mV
210 V_{AC}	1150 mV

220 V_{AC}	950 mV
230 V_{AC}	750 mV
240 V_{AC}	550 mV
250 V_{AC}	400 mV

Notes:

- The values in the table do not indicate that a scanner that is adjusted at f.ex 230 V should be readjusted when connected to a mains voltage of 200 V, but reflects the fact that the voltage on TP4 / TP5 changes with the mains voltage as indicated in the table.
- The voltages are not "stable" but will vary with fluctuations in line voltage and lamp temperature.
- The voltage on TP4 / TP5 increases, when the light output from the lamp decreases.
- The voltage on TP4 / TP5 is clamped to approximately 3.7 V. It may be necessary to turn P1 / P2 several turns CCW to bring the voltage below the clamp voltage.
- P1 adjusts the driver for the rear lamp and P2 adjusts the driver for the front lamp.

After adjustment of the Lamp Drivers run Test 16, Basic Calibration (or WIDEimage, Calibrate Scanner).

3.4.3 Stepper Motor Reference Voltages

The stepper motor must be stopped during adjustment of the reference voltages.

Adjust P3 until the voltage on TP7 reads

70 mV ± 10 mV

Adjust P4 until the voltage on TP8 reads

70 mV ± 10 mV

3.4.4 Fuses

The type and rating of the fuse on the LMDA-Board is:

F1: T2.0AH/250V type IEC 127- 2/5

CAUTION:
For continued protection against risk of fire, replace only with same type and rating of fuse.

3.4.5 Markings

FSC x040 CHROMA LMDAdd
FSC x050 MAGNUM LMDAdd
FSS 225x PANORAMA LMDAdd
CRYSTAL 40 LMDAdd
where dd = board revision number.

3.4.6 Jumper Settings

Jumper:	SR1
pos:	A

3.4.7 Hints

Control signals on J1:

pin 2: Lamp ON/OFF, LOW = ON
pin 8: Feed-Motor Step Pulse
pin 11: Feed-Motor Direction, LOW = FORWARD

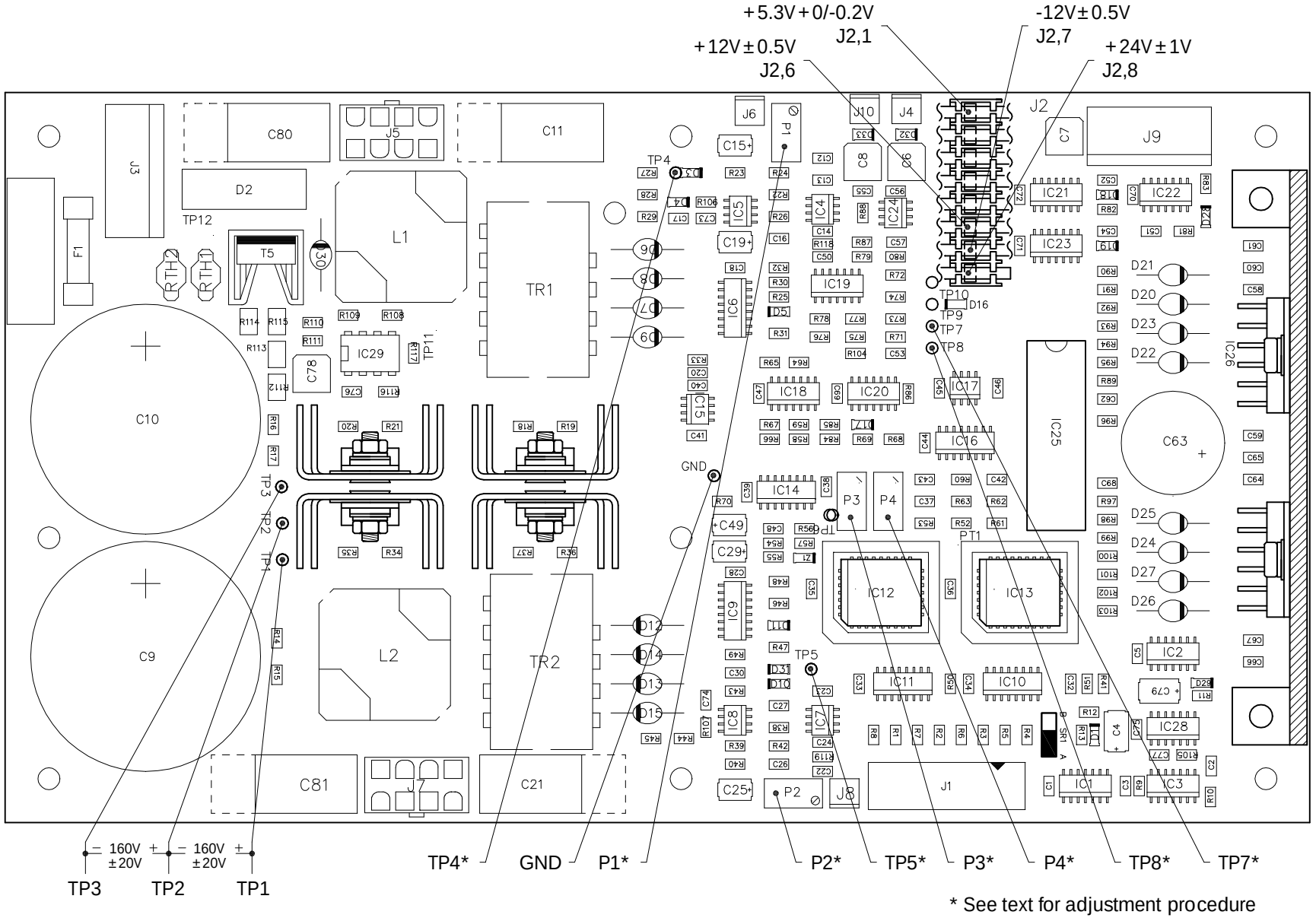


Fig. 3-2 LMD Component Layout

3.5 Check and Adjustment of Camera Board, CBC (MAGNUM and CHROMA only)

All test points referred to are shown in Fig. 3-3, page 44.
All voltages are measured relative to test point GND.

3.5.1 Supply Voltages

C46, bottom:	+5.3 V +0/-0.2 V (Digital)
C125, top:	+4.85 V +0.1/-0.2 V (Derived from +5.3 V on CBC)
C14, right:	+12 V ± 0.5 V (Analog)
C32, right:	+3.3 V ± 0.3V (Digital)

3.5.2 Adjustments

Applies to early CBC-Boards only:
The three potentiometers are factory set to max. signal level.
Note that the potentiometers are of the multi-turn type and that they must be turned CW until you hear a low click for each turn, or they have been turned at least ten fully turns.

3.5.3 Functional Test

SCANtest 4:

Test 7, Complete Hardware Test
Test 16, Basic Calibration

3.5.4 Markings

FSC x040 CHROMA	CBCAdd
FSC x050 MAGNUM	CBCAdd

where dd = board revision number.

3.5.5 Jumper Settings

No jumpers.

3.5.6 Hints

Supply Voltages:

5.3 V and +12 V is supplied from the SMPS via the SUA-Board.

3.3 V is supplied from a linear voltage regulator on the SUA-Board. The regulator is driven from 5.3 V.

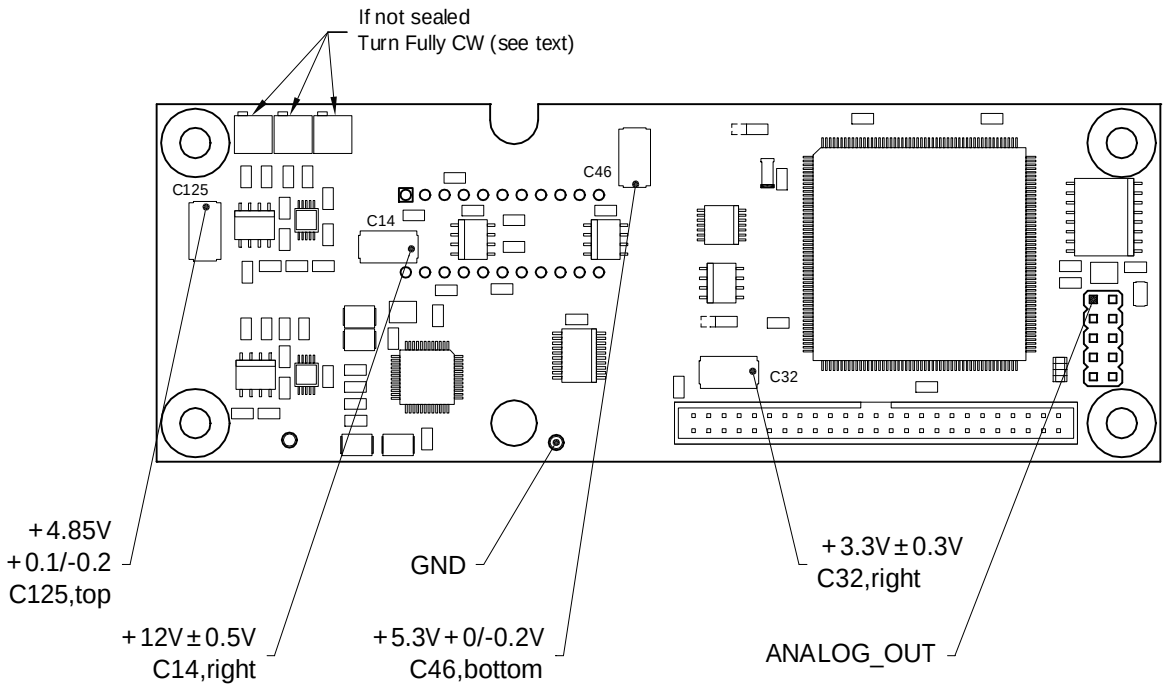
After replacement of CBC-Board, do:

- CCD-Centering, Section 4.2.4, page 83
- Vertical Positioning, Section 4.2.5, page 84
- Check Scan-Width, if it is within the limits given in Section 4.2.3, page 77, Focus will also be OK, and no further adjustments are required.
- Stitching and Vertical Alignment, Section 5.3, page 99

- Calibrate Scanner, Section 7.1.9, page 134

These adjustments can be made without loosening the Camera Fixing Screws and without loosening the Focus Lock Ring.

Layout for early MAGNUM scanners



Layout for current scanners

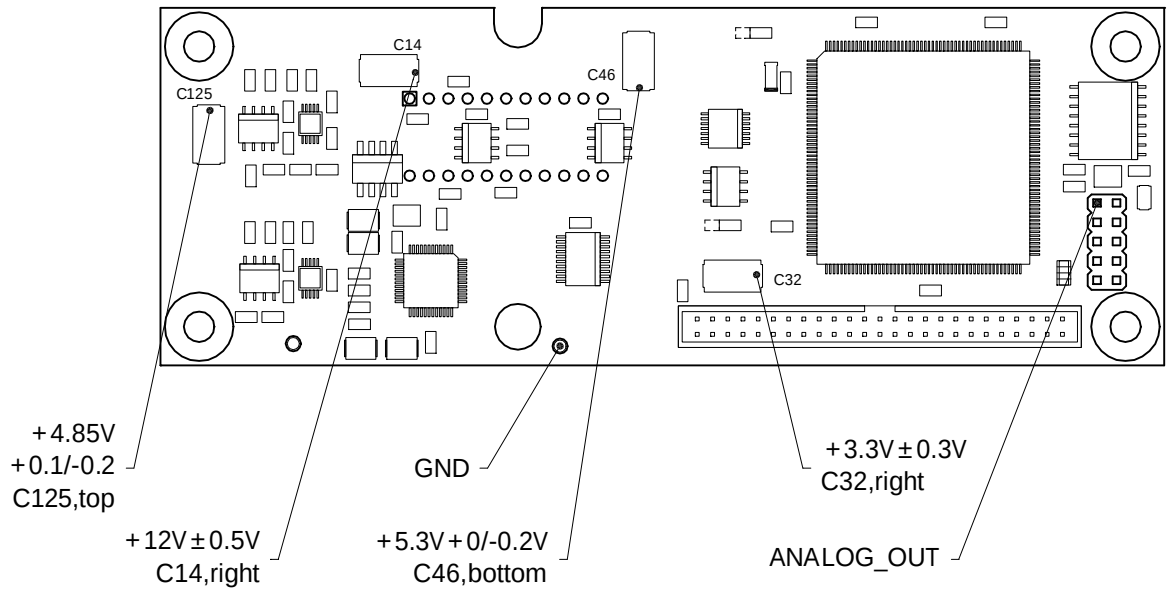


Fig. 3-3 CBC Component Layout

3.6 Check and Adjustment of Camera Board, CBB (PANORAMA and CRYSTAL only)

All test points referred to are shown in Fig. 3-4, page 46.
All voltages are measured relative to test point GND.

3.6.1 Supply Voltages

C46, bottom:	+5.3 V +0/-0.2 V (Digital)
C125, top:	+4.85 V +0.1/-0.2 V (Derived from +5.3 V on CBB)
U58, pin3:	+12 V ± 0.5 V (Analog)
C32, right:	+3.3 V ± 0.3 V (Digital)
U58, pin2	+5 V ± 0.25 V (Derived from +12 V on CBB)
U46, pin1	+9 V ± 0.4 V (Derived from +12 V on CBB)

3.6.2 Functional Test

SCANtest 4:

Test 7, Complete Hardware Test
Test 16, Basic Calibration

3.6.3 Markings

FSS 225x PANORAMA	CBBBdd
CRYSTAL 40	CBBBdd

where dd = board revision number.

3.6.4 Jumper Settings

No jumpers.

3.6.5 Hints

Supply Voltages:

5.3 V and +12 V is supplied from the SMPS via the SUA-Board.

3.3 V is supplied from a linear voltage regulator on the SUA-Board. The regulator is driven from 5.3 V.

After replacement of CBB-Board, do:

- CCD-Centering, Section 4.2.4, page 83
- Vertical Positioning, Section 4.2.5, page 84
- Check Scan-Width, if it is within the limits given in Section 4.2.3, page 77, Focus will also be OK, and no further adjustments are required.
- Stitching and Vertical Alignment, Section 5.3, page 99
- Calibrate Scanner, Section 7.1.9, page 134

These adjustments can be made without loosening the Camera Fixing Screws and without loosening the Focus Lock Ring.

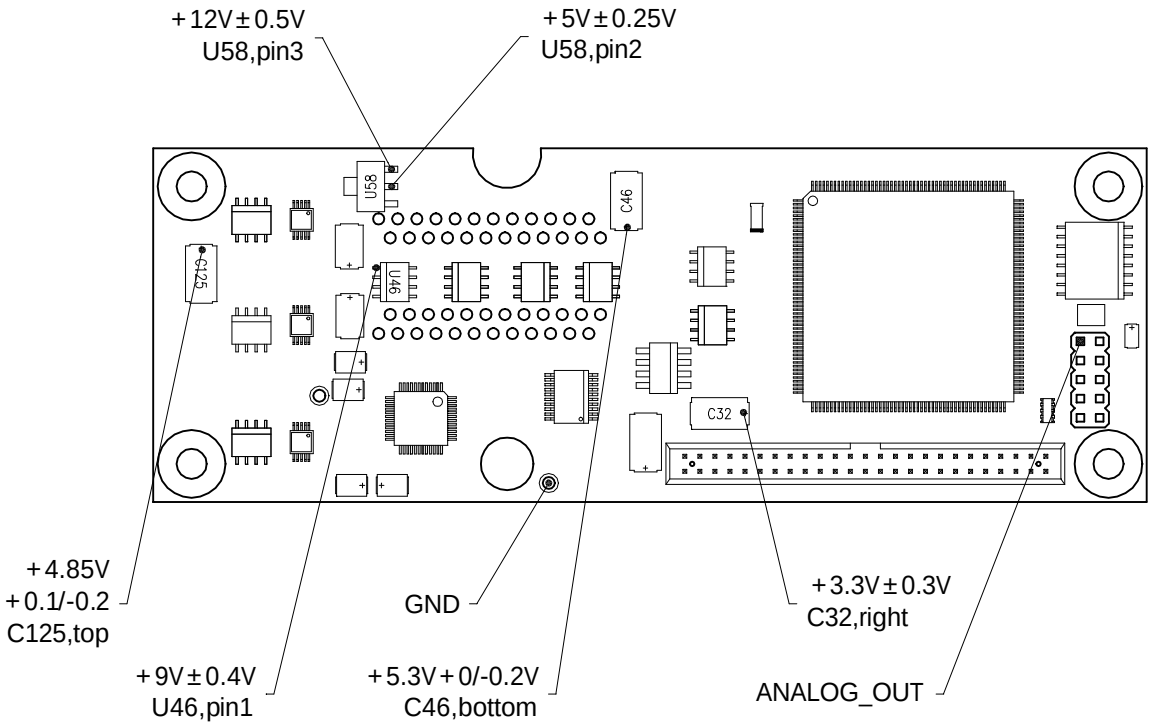


Fig. 3-4 CBB Component Layout

3.7 Check of Scanner Unit, SUA

All test points referred to below are shown in Fig. 3-5, page 49.
All voltages are measured relative to test points GND1, GND2, or GND3.

3.7.1 Supply Voltages

Check:

TEMP, pin3:	+5.3 V +0/-0.2 V
IC8, pin8:	+12 V ± 0.5 V
IC8, pin4:	-12 V ± 0.5 V
R1, right*:	+3.3 V ± 0.3 V
R123, right*:	+3.3 V ± 0.3 V
R151, left*:	+3.3 V ± 0.3 V

* Resistors not mounted, use pad as test point.

Terminator Power for SCAN SCSI bus:
D1, bottom: +5.0 V ± 0.3 V

Terminator Power for COPY SCSI bus:
D2, bottom: +5.0 V ± 0.3 V

Supply for FPGA on CBC/CBB-Boards:
J_CAM-D, pin35,37,39: +3.3 ± 0.3 V

3.7.2 Adjustments

No adjustments.

3.7.3 Functional Test

SCANtest 4:
Test 1 Scanner Information
Test 7, Complete HardwareTest

3.7.4 Markings

FSC x040 CHROMA	SUABdd
FSC x050 MAGNUM	SUABdd
FSS 225x PANORAMA	SUACdd
CRYSTAL 40	SUACdd

where dd = board revision number.

3.7.5 Switch Settings (Download Control Switches)

The download program reads the Download Control Switches, SW4 and SW5, on the SUA-Board to check if the actual firmware and the SUA hardware are compatible.
The Download Control Switches are factory set, and the setting must not be changed.

3.7.6 Jumper Settings

The jumper settings are:

Jumper:	SW1
Pos:	A

3.7.7 Signal LEDs on the SUA-Board

The three signal LEDs on the SUA-Board are for debugging purposes only. The ON/OFF pattern displayed by these LEDs is not significant.

3.7.8 Hints

After replacement of SUA-Board:
As all scanner parameters are stored in the Flash Memory on the SUA-Board, the following steps should be carried out after replacement of the SUA-Board:

- Download Firmware
- Adjust Stitching
- Run WIDEimage, Calibrate Scanner

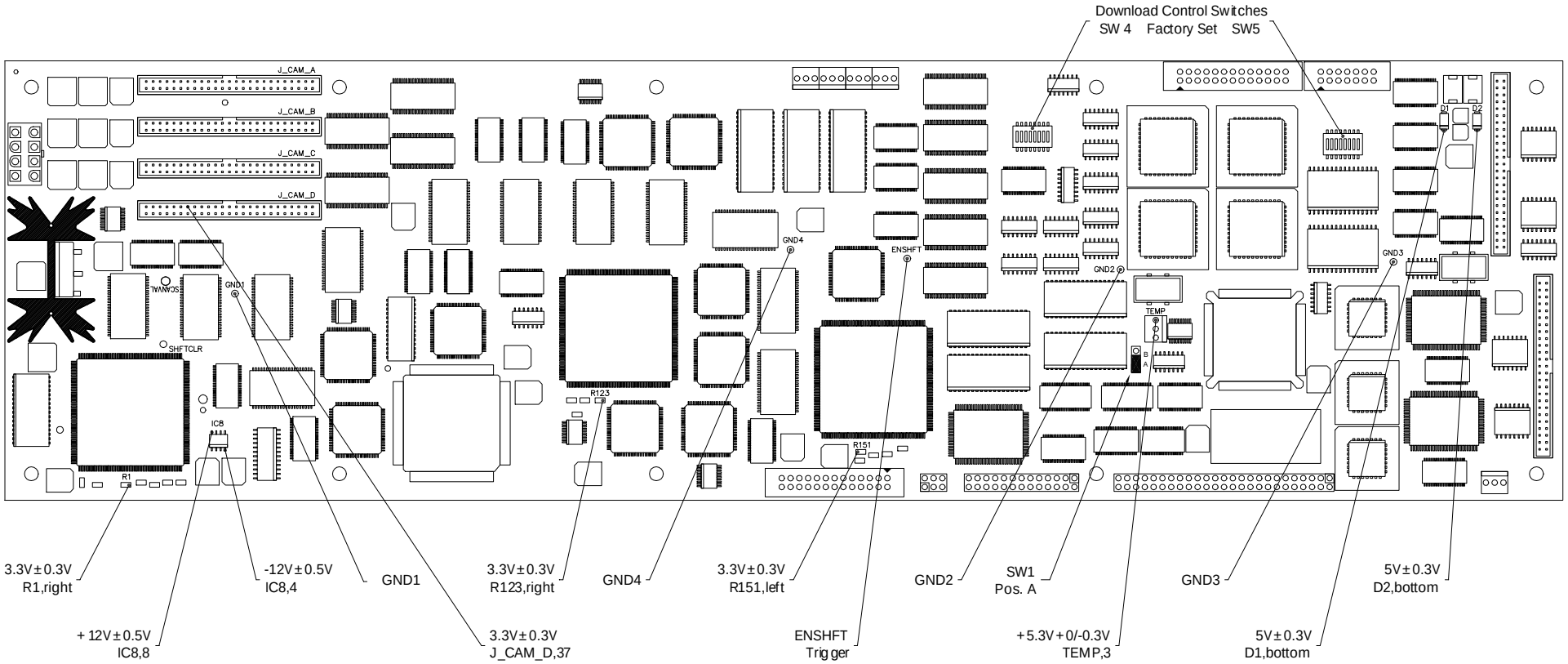


Fig. 3-5 SUA Component Layout

3.8 Check of Operator Panel, SKC

All test points referred to are shown in Fig. 3-6, page 51.

3.8.1 Supply Voltages

LED1, cathode:	GND
R3, bottom:	+5.3 V+0/-0.2 V

3.8.2 Functional Test

SCANtest 4:

Test 1, Scanner ID Switch
Test 2, LED test
Test 3, Key test

3.8.3 Markings

FSC x040 CHROMA	SKCAdd
FSC x050 MAGNUM	SKCAdd
FSS 225x PANORAMA	SKCAdd
CRYSTAL 40	SKCAdd

where dd = board revision number.

3.8.4 Switch Setting (Scanner ID)

DIP Switch Setting:

Switch No:	1	2	3	4	5	6	7	8
FSC x050 MAGNUM	OFF	OFF	OFF	OFF	OFF	OFF	OFF	**ON**
FSC x040 CHROMA	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	OFF
FSS 225x PANORAMA	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**
CRYSTAL 40	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**	**ON**

An undefined switch setting may cause the ‘Invalid Scanner ID’ Error Code to be displayed on the Operator Panel, see Section 8.3, page 142.

CAUTION:
The Scanner ID Switch setting is stored in the Flash Memory on the SUA-Board. Every time the scanner is switched ON, it reads the switch setting and if it is different from the stored value, the new setting will be stored and all other stored scanner parameters (including Stitching and Color Calibration) will be cleared to default values. This means that the scanner must be Stitched and Basic/Color Calibrated afterwards to restore the actual values.

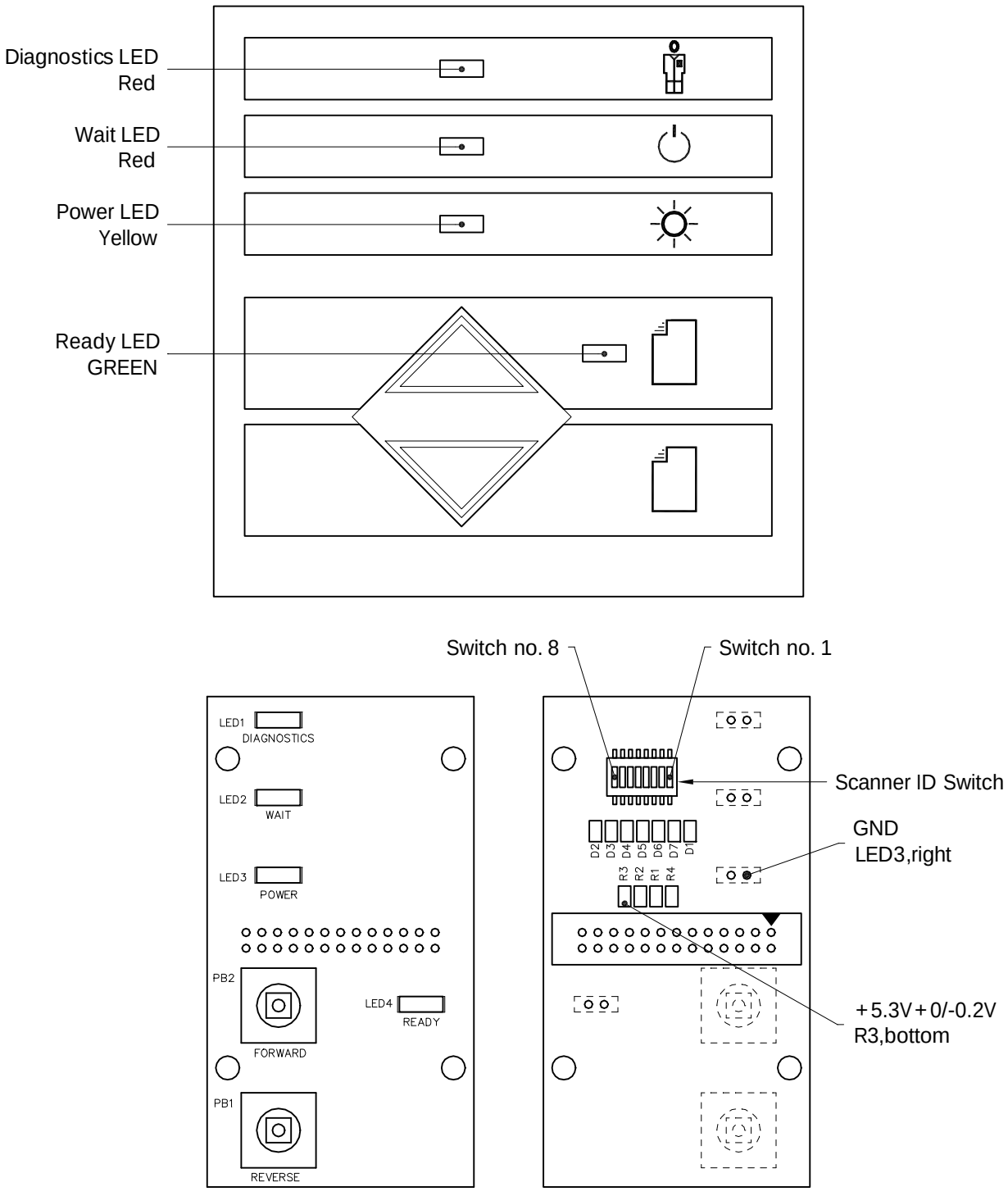


Fig. 3-6 SKC Component Layout

3.9 Check of Smart Card Reader, SCR

All test points referred to below are shown in Fig. 3-7, page 54.
All DC voltages are measured relative to test point GND (DIP Switch, right-side pins).

3.9.1 DC Voltages

R2, top: +5.3 V +0/-0.2 V

On MAGNUM scanners with s/n up to 00275, the Smart Card Reader is mounted inside the Top Cover. To check the DC voltage on these machines, remove the Smart Card and check the voltage on the Smart Card Connector, pin 3. This voltage is measured through a 10 kOhm resistor and may be a little lower than the voltage on R3, bottom.

3.9.2 Functional Test

SCANtest 4:
Test 1, Scanner Model (Smart Card), SCSI ID

3.9.3 Markings

FSC x040 CHROMA SCRAdd
FSC x050 MAGNUM SCRAdd
FSS 225x PANORAMA SCRAdd
CRYSTAL 40 SCRAdd
where dd = board revision number.

3.9.4 Switch Setting (SCSI ID)

Default DIP Switch Setting:

Switch No:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
SCSI ID 2	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF

SCSI ID, Terminator, and Communication Mode Selection:

Switch No:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
SCSI ID 0	**ON**	**ON**	**ON**	X	X	X	X	X
SCSI ID 1	OFF	**ON**	**ON**	X	X	X	X	X
SCSI ID 2	**ON**	OFF	**ON**	X	X	X	X	X
SCSI ID 3	OFF	OFF	**ON**	X	X	X	X	X
SCSI ID 4	**ON**	**ON**	OFF	X	X	X	X	X
SCSI ID 5	OFF	**ON**	OFF	X	X	X	X	X
SCSI ID 6	**ON**	OFF	OFF	X	X	X	X	X
SCSI ID 7	OFF	OFF	OFF	X	X	X	X	X
SCAN-SCSI Termination Intern, active: Extern:				 ON OFF				
SCAN-SCSI Transfer mode Asynchronous: Synchronous:					 ON OFF			
COPY-SCSI Transfer mode Asynchronous: Synchronous:						 ON OFF		

Troubleshooting and Test Switches:

Switch No:	1	2	3	4	5	6	7	8
Boot start-up Forced: Normal:							 ON OFF	
Factory testing Self-test: Normal:								 ON OFF

SW1-3: SCSI ID (Common to SCSI 0 (SCAN SCSI) and SCSI 1 (COPY SCSI))

SW4: Selects internal, active SCSI termination or external, passive SCSI termination, normally set to ON (Applies to the SCAN-SCSI 0-A and 0-B connectors, the COPY SCSI connector always has internal, active termination ON).

SW5: If the SCSI communication fails (on SCAN SCSI), try to run 'Asynchronous'. This mode is intended for debugging, and SW5 should normally be set to OFF.

SW6: If the SCSI communication fails (on COPY SCSI), try to run 'Asynchronous'. This mode is intended for debugging, and SW6 should normally be set to OFF.

SW7: If download fails, try to set SW7 to ON. For normal operation SW7 must be set to OFF.

SW8: Reserved for factory testing and **must** be set to OFF.

NB! The switches are read at power-on only, and the scanner must be switched OFF and back ON for a changed switch setting to become effective.

3.9.5 Signal LED on the SCR-Board

The signal LED on the SCR-Board turns ON when the Smart Card is inserted. It only signals, that a Smart Card has been inserted, it does not show whether the card is valid or not.

3.9.6 Hints

When servicing MAGNUM scanners with s/n up to 00275 (with the Smart Card Reader mounted inside the Top Cover), it may be convenient to disconnect the Smart Card Reader from the SUA-Board.
If the Smart Card Reader is disconnected, the scanner will operate as the basic variant (FSC 3040 CHROMA, FSC 3050 MAGNUM, FSS 2250 PANORAMA and CRYSTAL 40 respectively).

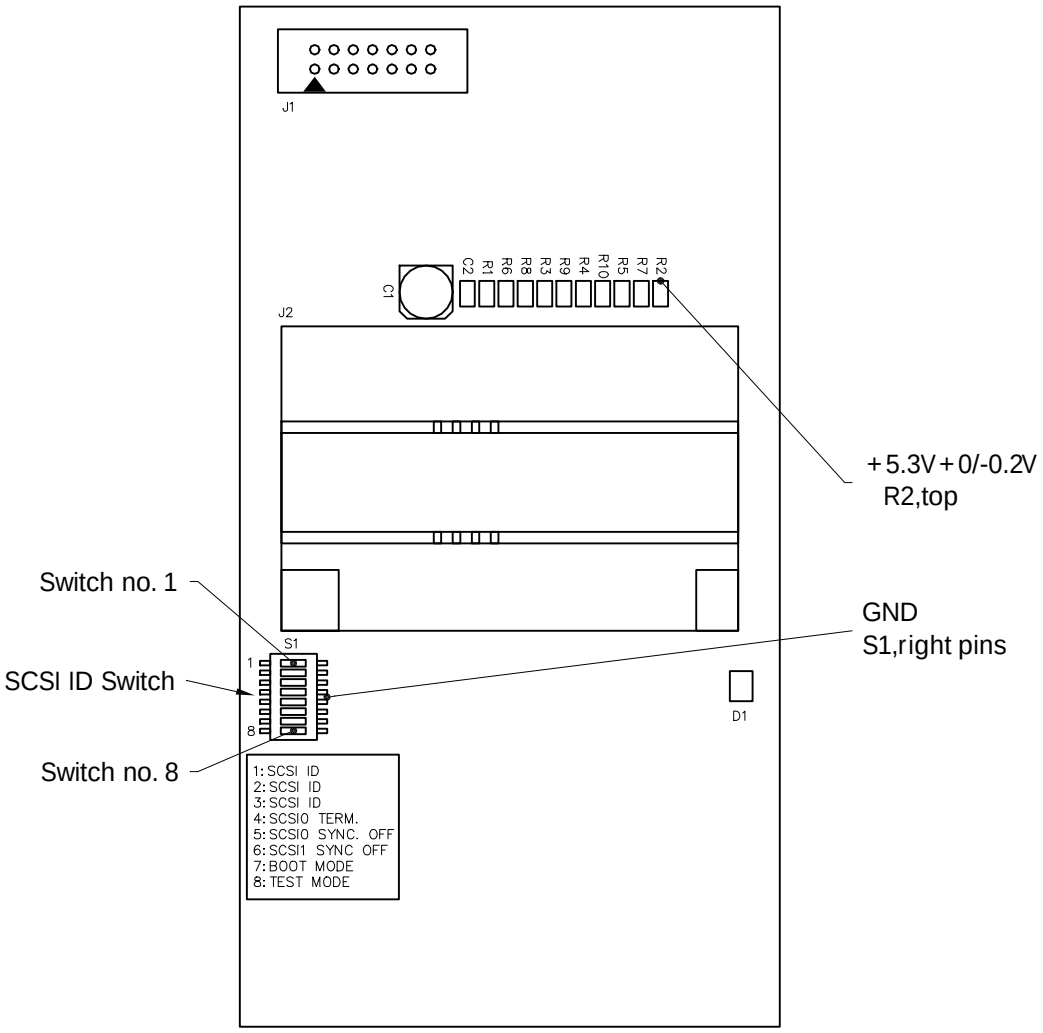


Fig. 3-7 SCR Component Layout

3.10 Check of Lamp Sensor Board, OSB

The OSB Component Layout is shown in Fig. 3-8, page 56.

3.10.1 Functional Test

SCANtest 4:

Test 5, Lamp Test

Connect a voltmeter to TP4 respectively TP5 on the LMD-Board

Turn Lamps OFF / ON

The voltage on TP4 and TP5 should change to approx. 3.7 V when the lamps are turned OFF. When the lamps are ON the voltage should be as described in Section 3.4.2, page 38.

3.10.2 Markings

FSC x040 CHROMA	OBSC-d.d
FSC x050 MAGNUM	OBSC-d.d
FSS 225x PANORAMA	OBSC-d.d
CRYSTAL 40	OBSC-d.d

where d.d = board revision number.

3.11 Check of Optointerrupter Board, OIBA

The OIB Component Layout is shown in Fig. 3-9, page 56.

3.11.1 Functional Test

SCANtest 4:

Test 4, Original-Sensor Test

3.11.2 Markings

FSC x040 CHROMA	OIBA-d.d
FSC x050 MAGNUM	OIBA-d.d
FSS 225x PANORAMA	OIBA-d.d
CRYSTAL 40	OIBA-d.d

where d.d = board revision number.

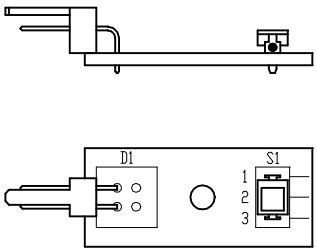


Fig. 3-8 OSB Component Layout

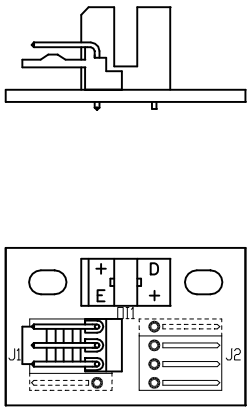


Fig. 3-9 OIBA Component Layout

3.12 Adjustment of Original Sensors

The Original Sensors are located under the End Cover at the Operator Panel end of the scanner.

3.12.1 Adjustment of Switch Point

See Fig. 3-10, page 58.

To adjust the Original Sensors:

- Remove the Guard Plate over the Optical Interrupter Board
- The position of the Original Sensor can now be adjusted by loosening the screws that hold the bracket with the Optical Interrupter Board. To adjust the switch point, shift the OIB-Board up/down until the peak of the curved Original Sensor Actuator is:

  3.9 mm +/- 0.5 mm

  above the top of the Feed Rollers.

All four Original Sensor Actuators must be within the above tolerance.

Check:

- That the Original Sensor Shutter moves freely in the gap of the opto interrupter, when the Sensor Actuator is activated.
- That the Entry Original Sensor Shutter does not touch the press nut for the Glass Plate bearing, when the Sensor Actuator is activated.
- That the Torsion Springs are correctly mounted.

3.12.2 Functional Test

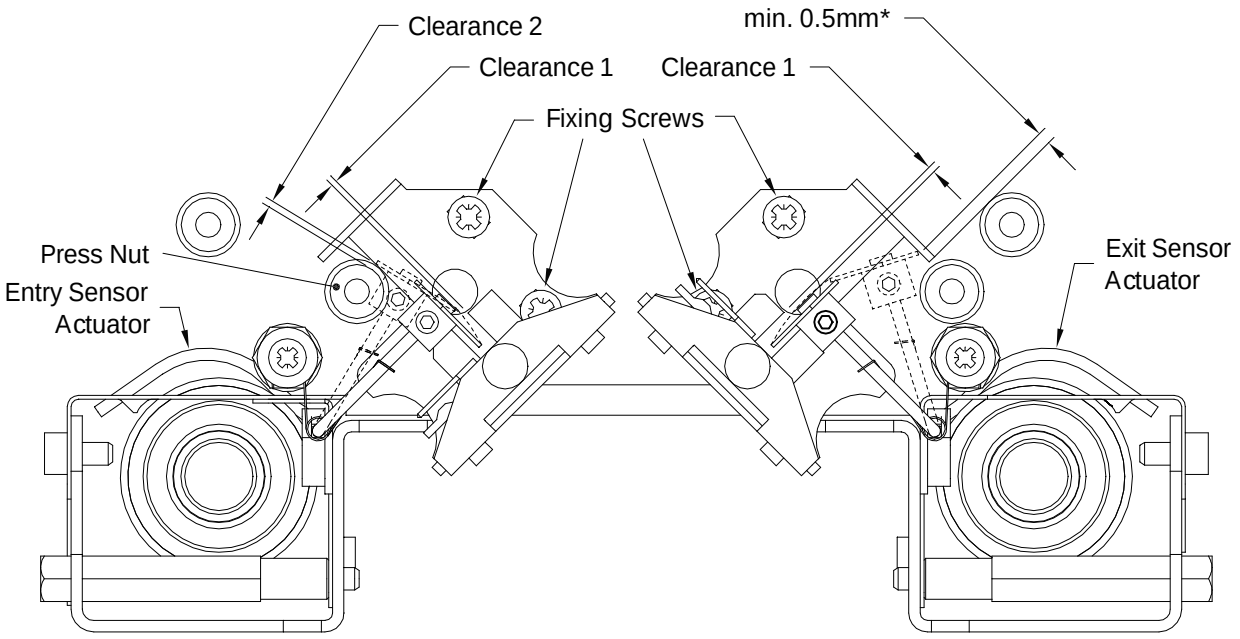
SCANtest 4:

Test 4, Original Sensor Test

3.12.3 Hints

The original's Start of Scan position is determined by the Exit Sensor. The original is first moved forward to activate the Exit Sensor and after that moved a pre-defined distance backwards to the Start of Scan position.
End of Scan is determined by a pre-defined distance form the position where the original releases the Entry Sensor.

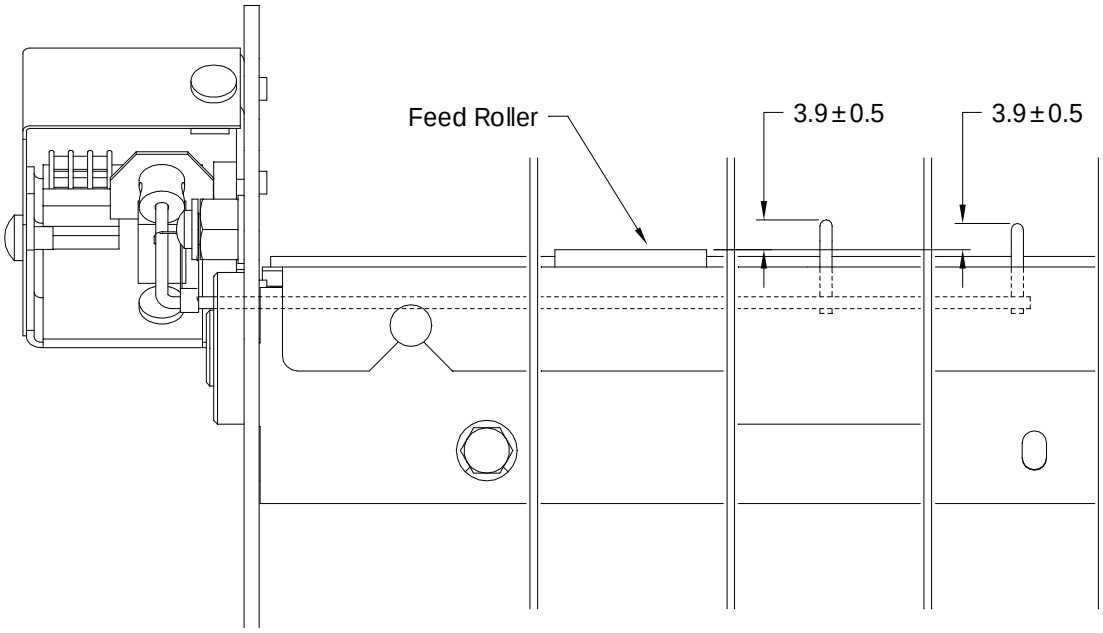
The points of Start of Scan and End of Scan may be offset from WIDEimage (Scanner Setup / Media Offset).



Clerance 1: Make sure that the shutter plates do not touch the legs of the optointerrupter when moving (clearance >0.5 mm)

Clerance 2: Make sure that the shutter plates do not touch the press-nut when moving (clearance > 0.5mm)

* : This does only apply to some of the early scanners.



Rear View

Fig. 3-10 Adjustment of Original-Sensors

3.13 Check of Media Thickness Detector

The Media Thickness Detector is located under the right End Cover and is activated by the Media Thickness Adjustment Slider when the Original Guide Plate is full down in the Normal position (0-2 mm).

3.13.1 Functional Test

SCANtest 4:

Test 4, Original Sensor and Media Thickness Detector

In Test 4, slide the Media Thickness Adjustment Slider in and out to turn the LEDs on the Operator Panel ON/OFF.

4. CCD-Cameras

The adjustment procedures presented in this chapter cover all adjustments needed for replacing the complete CCD-camera.

It will hardly ever be necessary to replace mechanical parts such as Lens, Camera Housing, etc., and in most cases, the only adjustments necessary after replacement of the CBC/CBB-Board are:

- CCD-Centering, Section 4.2.4 page 83
- Vertical Positioning, Section 4.2.5, page 84
- Stitching and Vertical Alignment, Section 5.3, page 99
- WIDEimage, Calibrate Scanner

After replacement of the CBC/CBB-Board, the Scan-Width should be checked. If it is within the limits given in Section 4.2.3, page 77, then Focus will also be OK and no further adjustments will be required.

These adjustments can be made without loosening the Camera Fixing Screws and without loosening the Focus Lock Ring.

4.1 Description of CCD-Cameras

The CCD-Camera, Side View is shown in Fig. 4-1, page 62.

The CCD-Camera basically consist of:

- Lens
- UV/IR Filter (MAGNUM and CHROMA only) *)
- Lens Adapter
- Camera Housing
- Camera Back-Plate
- CCD Mounting Plate
- CBC/CBB Camera Board
- Camera Base Plate

*) The UV/IR Filter is mounted in the Lens.

The parts of the CCD-Camera are mounted on a Camera Base Plate, and the complete CCD-Camera is mounted on a Mounting Platform, which is welded to the scanner chassis.
The Camera is positioned with the optical axis perpendicular to the scan-area by means of two guide pins extending from the bottom of the Base Plate down into two slots in the Mounting Platform.
When the three Camera Fixing Screws are loosened for Camera Adjustment, two tension springs pull the Camera Base Plate down against the Mounting Platform. Another spring pulls the CCD Camera in forward direction to keep the Scan Width Adjustment Screw in contact with the scanner chassis, and to the left to align the guide pins with the left edge of the slots in the Mounting Platform.

The Camera Housing can be tilted slightly up and down to position the Scanline in the "vertical" direction by turning the Vertical Position Pre-Set Screw.

Focus

The CCD-Camera is focused by loosening the Focus Lock Ring and turning the Lens Adapter to get the maximal amplitude of the image of the Focus Pattern.
The Lens itself is mounted in the Lens Adapter, and its position in the adapter is secured by three Allen screws. When these screws are loosened, the lens can be rotated to have the dot on the lens pointing upwards. This is the "best position" as determined by the lens manufacturer. This "best position" is not critical, and when doing field adjustments it will hardly ever be necessary to change the factory set position of the Lens.

Scan-Width

The Scan-Width depends on the distance between the CCD-Camera and the scan-area. It can be adjusted by loosening the three Camera Fixing Screws and turning the Scan Width Adjustment Screw to slide the CCD-Camera back and forth to get the required number of Scan-Width Units within the field of vision (see Scan-Width Pattern - Fig. 4-22, page 92). The scaling accuracy of the scanner depends directly on the accuracy of the Scan-Width adjustment.

Vertical Positioning of CCD-Cameras

To set the basic Vertical Position of all cameras, the lock screws of the Vertical Alignment Arms are loosened and the Vertical Position Pre-Set Screws adjusted to get 8 Black Lines of the Vertical Position Pattern (see Fig. 4-22, page 92).
After the basic adjustment, the Vertical Alignment Screws are turned to bring the Vertical Alignment Arms into mid position and the lock screws are tightened.
On all cameras but one (Camera B), telescopic tubes connect the Vertical Alignment Screws with adjustment screws accessible through holes behind the Model Streamer on the Front Profile.

The Vertical Position Adjustment of Camera B may be secured by a lock screw - see Fig. 4-21, page 91 (the earliest MAGNUM scanners have no lock screw).

The final positioning of the scanline within the scan-area, is done by shifting the CCD Mounting Plate relative to the Camera Housing.

Oscilloscope Images for Camera Adjustment

Fig. 4-2, page 63 shows the relation between the patterns on the Optical Adjustment Pattern and the waveforms seen on the oscilloscope during Camera Adjustment.

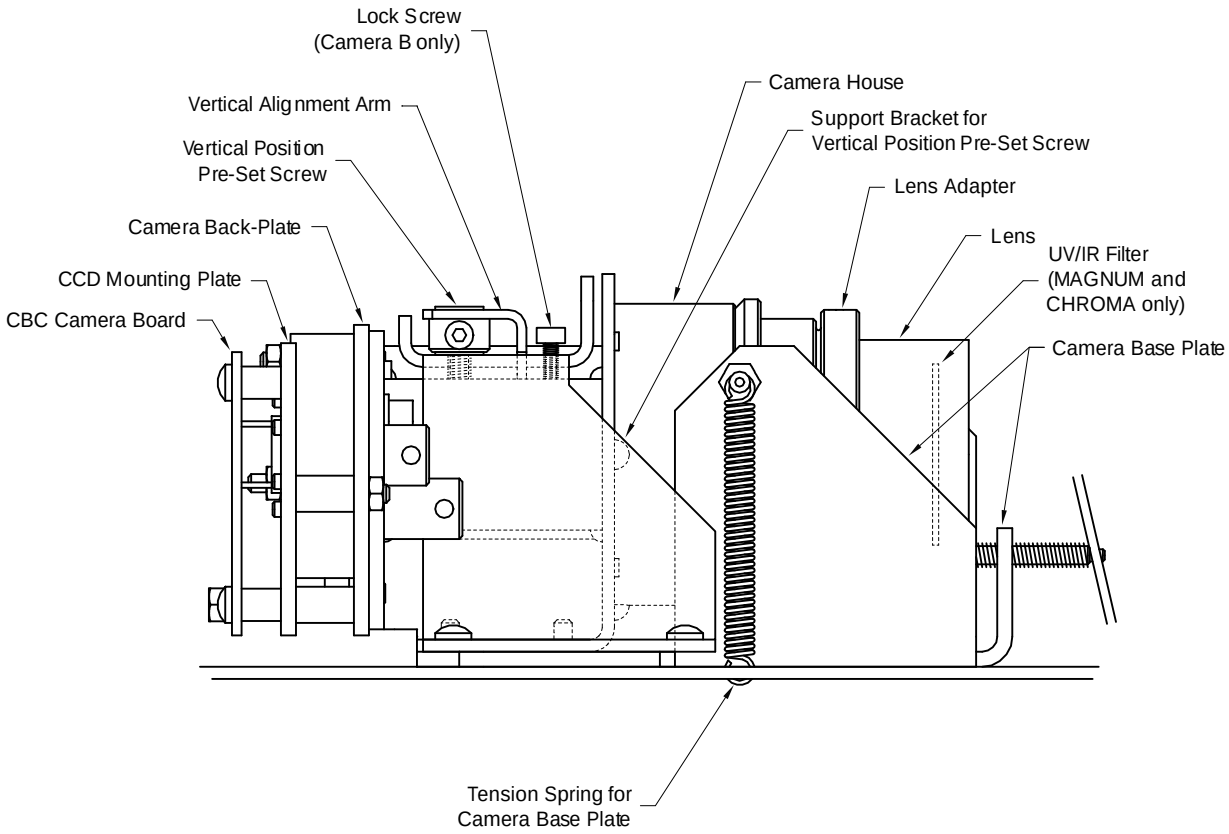


Fig. 4-1 CCD-Camera, Side View

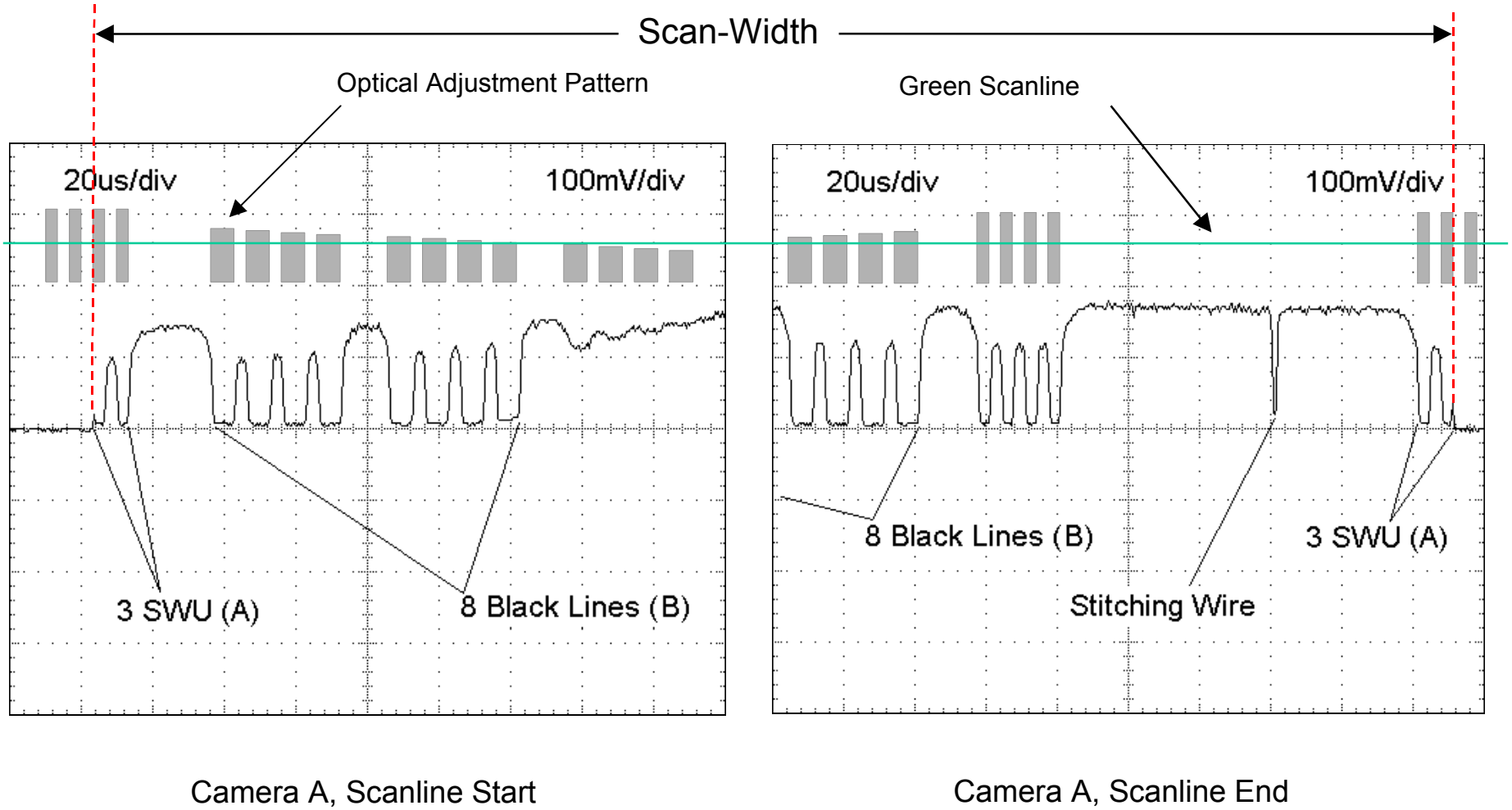


Fig. 4-2 Oscilloscope Images for Camera Adjustment

4.2 CCD-Camera Adjustment

To get access to the CCD Cameras the Top Cover must be removed.

Equipment needed:

- 2 channel oscilloscope, BW ≥ 20 MHz, R_i > 10 MOhm
- Optical Adjustment Pattern:

FSC x040 CHROMA:	6799A130
FSC x050 MAGNUM:	6799A103
FSS 225x PANORAMA:	6799A135
CRYSTAL 40 :	6799A135

- Focus Pattern: 6799A219

Test points and adjustment tools are shown in:

Fig. 4-20 Test Points for Camera Adjustments, page 90
Fig. 4-21 CCD-Camera, Top View, page 91
Fig. 4-22 Optical Adjustment Patterns, page 92
Fig. 4-23 Focus Pattern, page 93

In the description of the adjustment procedures, references are made to sub-patterns A, B, and C of the Optical Adjustment Pattern. These sub-patterns are shown in Fig. 4-22, page 92.
The adjustment procedures in this chapter are given under the assumption that the scanner is connected to an IBM PC or compatible computer with SCANtest 4 running.

4.2.1 Light Profiles

Oscilloscope images of the Light Profiles are shown in:

Fig. 4-3 FSC x040 CHROMA Light Profiles, Uncorrected, page 66
Fig. 4-4 FSC x040 CHROMA Light Profiles, Corrected, page 67
Fig. 4-5 FSC x050 MAGNUM Light Profiles, Uncorrected, page 68
Fig. 4-6 FSC x050 MAGNUM Light Profiles, Corrected, page 69
Fig. 4-7 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles, Uncorrected, page 70
Fig. 4-8 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles, Corrected, page 71

The White-Signal Level on the CHROMA, MAGNUM, PANORAMA, and CRYSTAL scanners cannot be manually adjusted.

The CBC-Boards used in early MAGNUM scanners may have three potentiometers P1, P2, and P3 mounted. The potentiometers are of the multi-turn type and they must be turned fully CW, that is, until you hear a low click for each turn, or they have been turned at least ten full turns.

Procedure for Check of Light Profiles

All measurements are relative to test point GND.

Place the Original Guide Plate in the scan-area.

Connect the oscilloscope to test point ANALOG_OUT on the CBC/CBB-Board and trigger to test point ENSHFT on the SUA-Board, see Fig. 4-20, page 90.

Start SCANtest 4

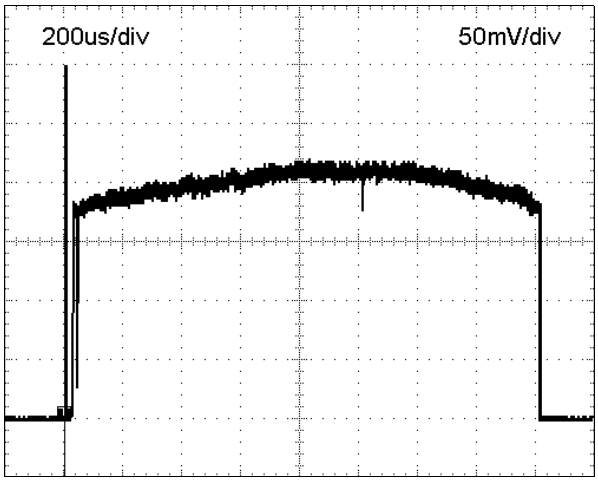
Select Test 9

Select Uncorrected or Corrected Light Profile

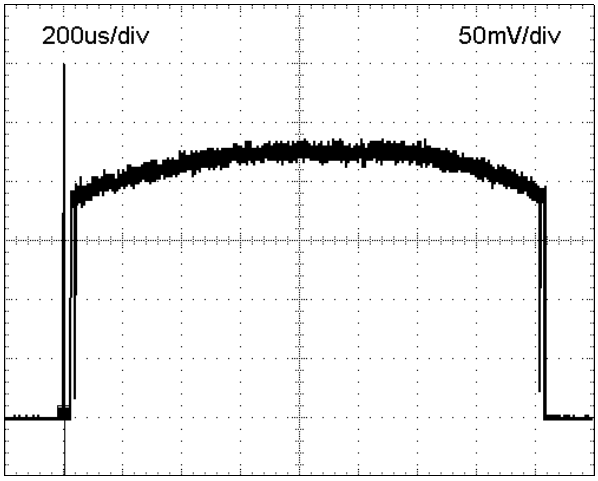
Select Scan Green (MAGNUM and CHROMA only)

Compare the oscilloscope images with the relevant sample images listed above.

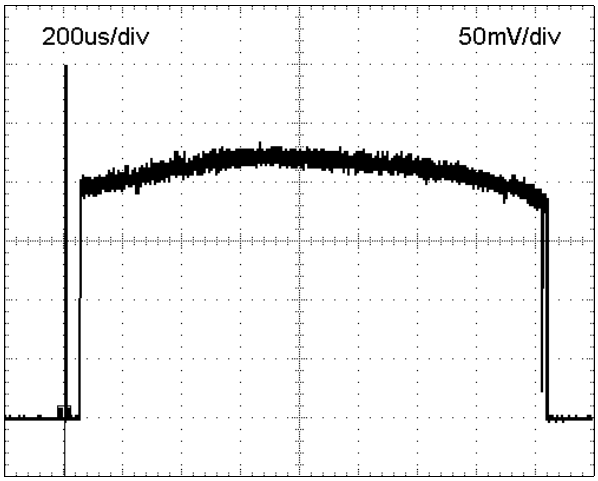
If the signal level of the Uncorrected Light Profiles differ much from the sample images, the scanner might need to be calibrated by Calibrate Scanner.



Camera A Light Profile, Uncorrected

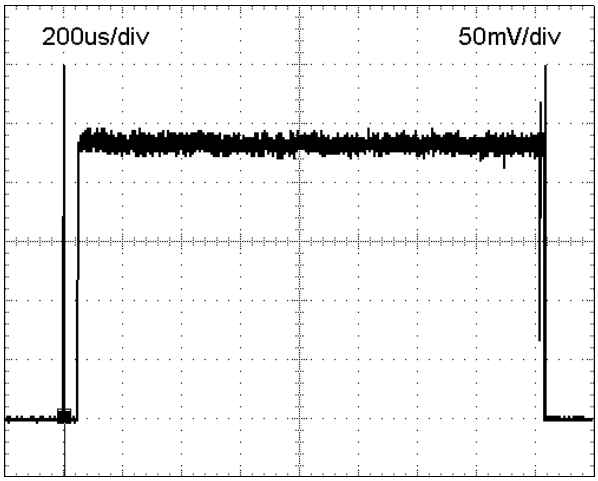


Camera B Light Profile, Uncorrected

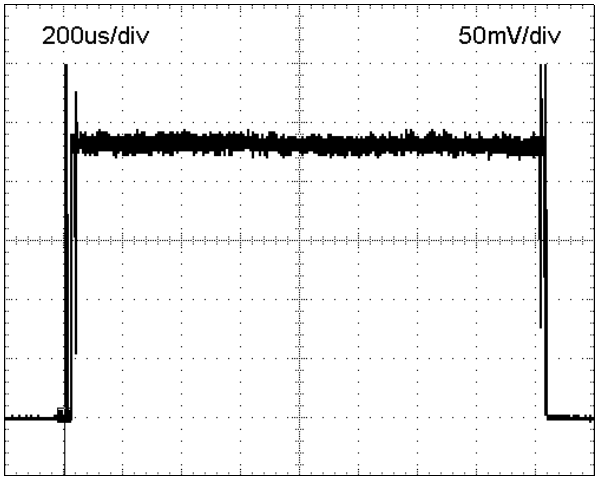


Camera C Light Profile, Uncorrected

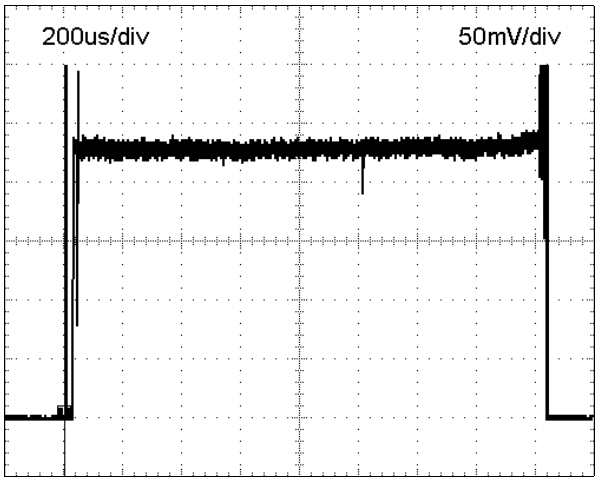
Fig. 4-3 FSC x040 CHROMA Light Profiles, Uncorrected



Camera A Light Profile, Corrected
White Background Plate

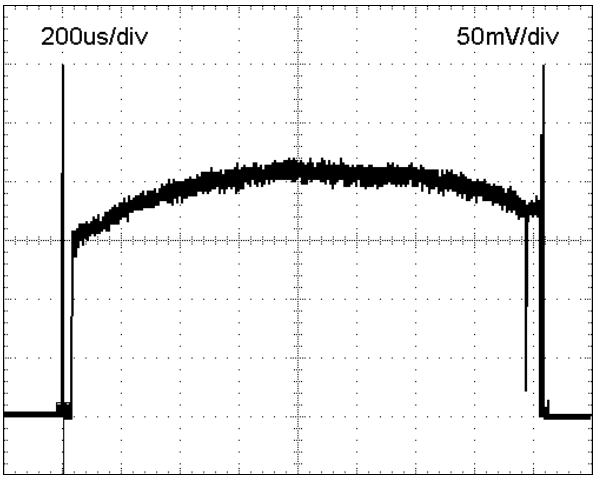


Camera B Light Profile, Corrected
White Background Plate

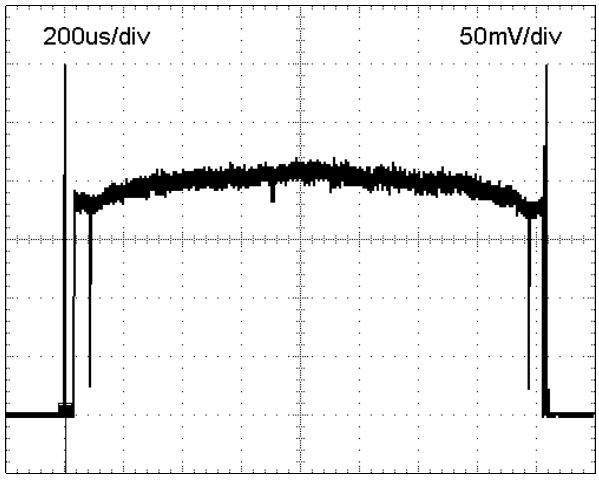


Camera C Light Profile, Corrected
White Background Plate

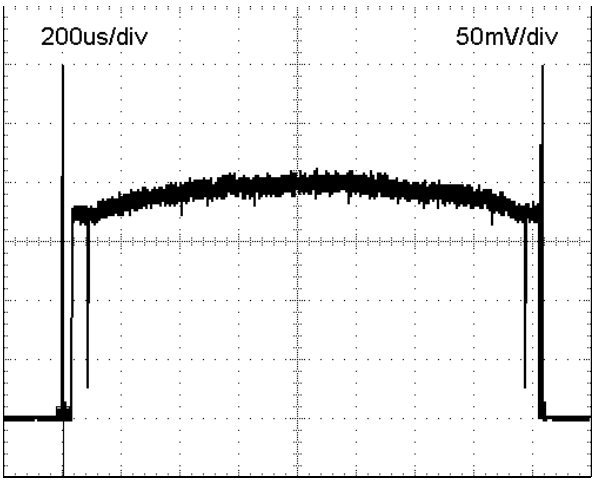
Fig. 4-4 FSC x040 CHROMA Light Profiles, Corrected



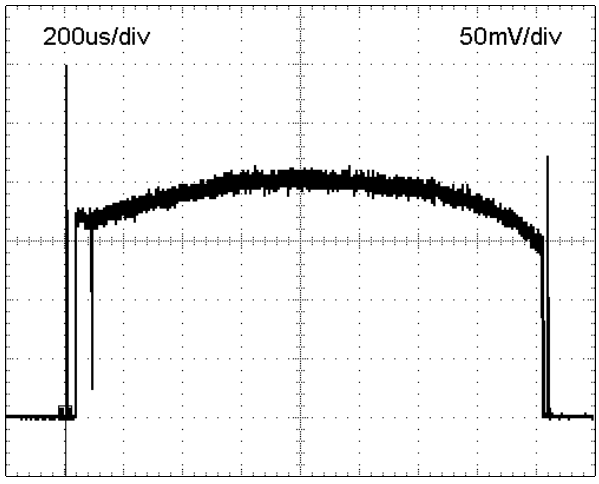
Camera A Light Profile, Uncorrected



Camera B Light Profile, Uncorrected

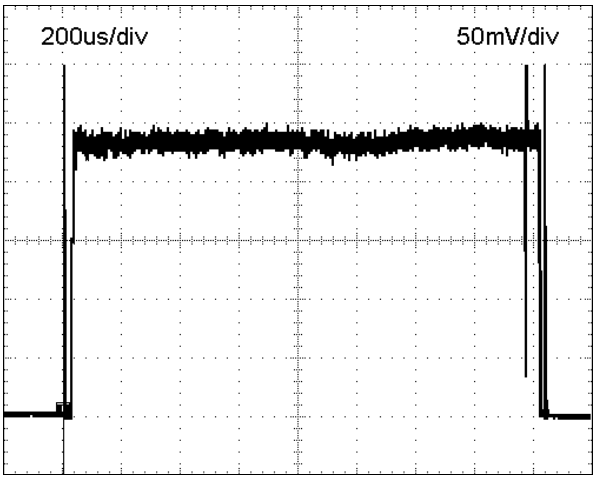


Camera C Light Profile, Uncorrected

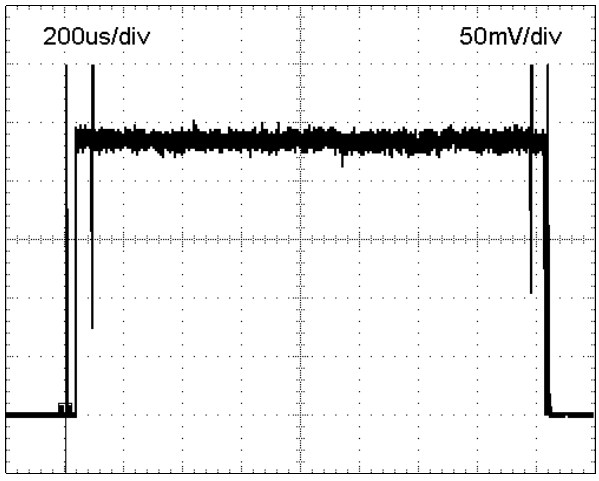


Camera D Light Profile, Uncorrected

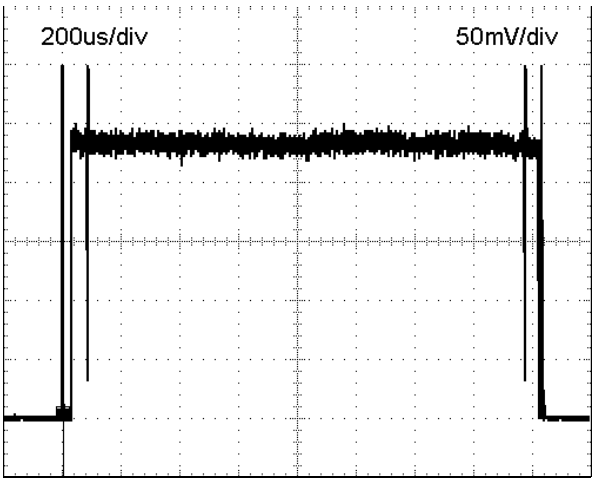
Fig. 4-5 FSC x050 MAGNUM Light Profiles, Uncorrected



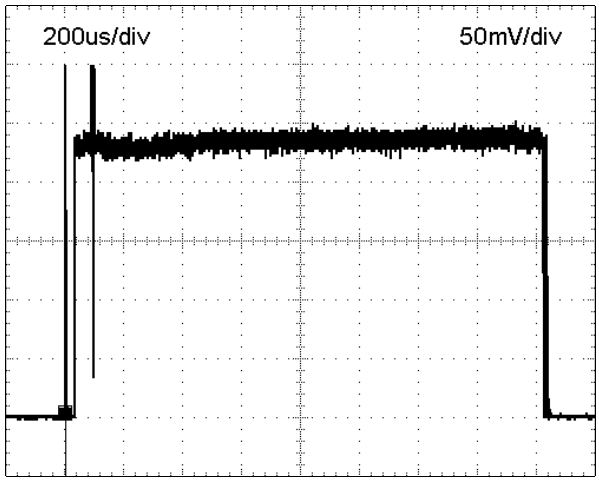
Camera A Light Profile, Corrected
White Background Plate



Camera B Light Profile, Corrected
White Background Plate

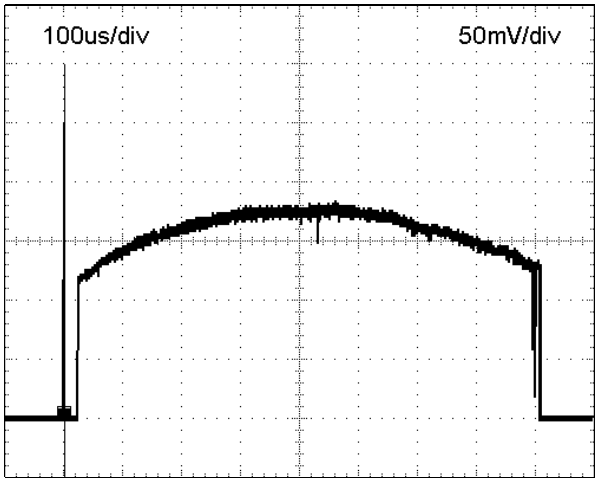


Camera C Light Profile, Corrected
White Background Plate

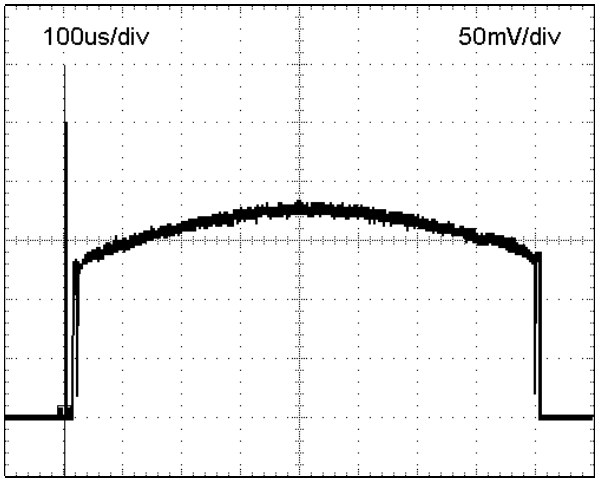


Camera D Light Profile, Corrected
White Background Plate

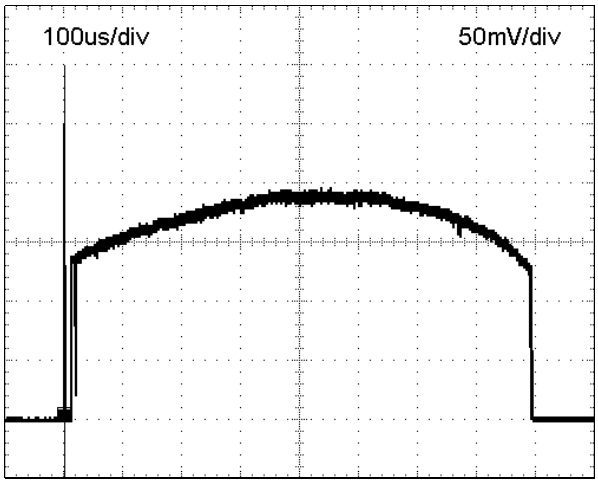
Fig. 4-6 FSC x050 MAGNUM Light Profiles, Corrected



Camera A Light Profile, Uncorrected

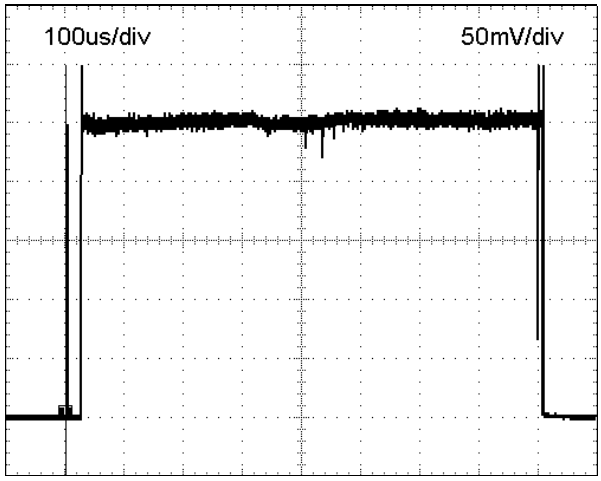


Camera B Light Profile, Uncorrected

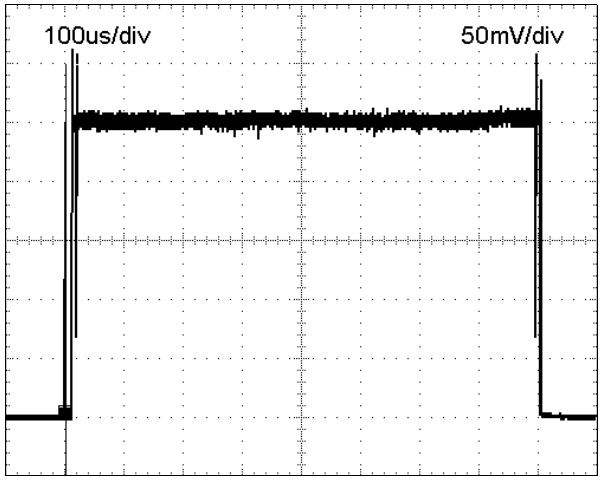


Camera C Light Profile, Uncorrected

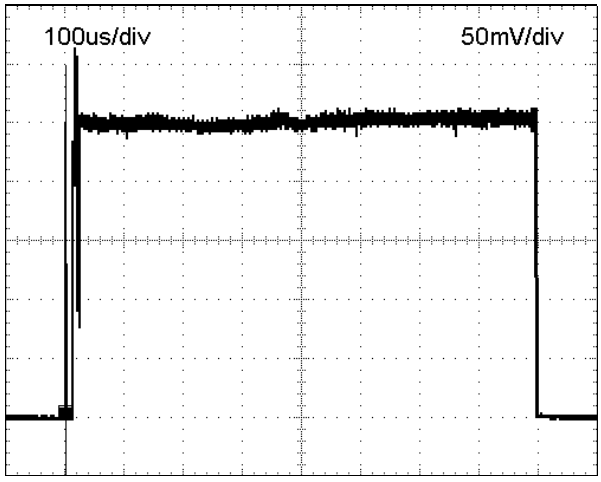
Fig. 4-7 FSS 225x PANORAMA, CRYSTAL 40 Light Profiles, Uncorrected



Camera A Light Profile, Corrected
White Background Plate



Camera B Light Profile, Corrected
White Background Plate



Camera C Light Profile, Corrected
White Background Plate

Fig. 4-8 FSS 225x PANORAMA, CRYSTAL 40 Light Profiles, Corrected

4.2.2 Focus

Oscilloscope images of the Focus adjustments are shown in:

Fig. 4-9 FSC x040 CHROMA Focus Signals, page 74
Fig. 4-10 FSC x050 MAGNUM Focus Signals, page 75
Fig. 4-11 FSS 225x PANORAMA, CRYSTAL 40, Focus Signals, page 76

Adjustment Procedure

All measurements are relative to test point GND.

Do not loosen the camera. The construction of the camera ensures that the optical axis of the lens is perpendicular to the scanning area and hence no alignment of the camera housing is necessary.
Always perform the Focus adjustment before adjusting the Scan-Width, see "Interaction" below.

Connect the oscilloscope to test point ANALOG_OUT on the CBC/CBB-Board and trigger to test point ENSHFT on the SUA-Board, see Fig. 4-20, page 90.

Start SCANtest 4

Select Test 9

Select Corrected Light Profile*)

Select Scan Blue

*) *Note:* If the camera is completely out of adjustment it may not be possible to run Test 9 in 'Corrected' mode. In that case, select 'Uncorrected' and with the Optical Adjustment Pattern placed in the scan-area make a coarse adjustment of Focus and Scan-Width before continuing.

Insert the Focus Pattern and feed it by using the Forward Key until the image of the pattern with the resolution as shown below is seen on the oscilloscope:

Model	Focus Pattern	Resolution
FSC x050 MAGNUM	6799A219	5 lp/mm
FSCx040 CHROMA	6799A219	5 lp/mm
FSS 225x PANORAMA	6799A219	3.3 lp/mm
CRYSTAL 40	6799A219	3.3 lp/mm

Loosen the Focus Lock Ring and turn the Lens Adapter to get maximum amplitude of the Focus signal.

The amplitude of the Focus signal (Corrected) should be even within:

Min/Max > 0.7 for each separate camera.

Min/Max > 0.8 at the transition between adjacent cameras.

If the dot does not point in upwards direction after focusing (indicating the 'best position' of the Lens):

Mark the upward direction on the Lens Adapter

Loosen the Focus Lock Ring

Turn the Lens Adapter and loosen the Lens Fixing Screws

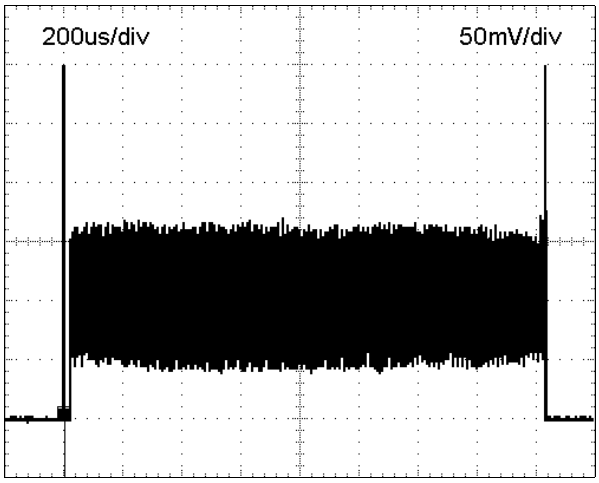
Rotate the lens to align the dot with the upwards mark on the Lens Adapter

Tighten the Lens Fixing Screws (do not over-tighten)

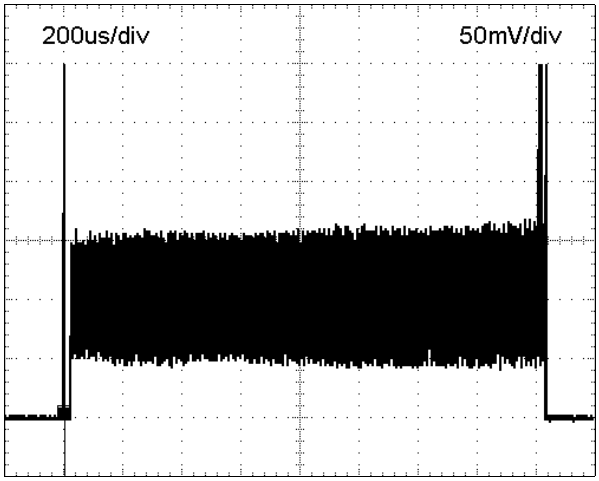
Turn the Lens Adapter to readjust the Focus and tighten the Focus Lock Ring to secure the Focus setting.

Interaction
The Focus adjustment has a big influence on the Scan-Width adjustment. Therefore the Scan-Width must be checked and readjusted if necessary when the Focus adjustment has been changed. On the other hand, the Focus adjustment is relative tolerant to changes in the Scan-Width adjustment and as a rule of thumb, the Scan-Width adjustment can be changed ±1 SWU without the need for re-focusing.

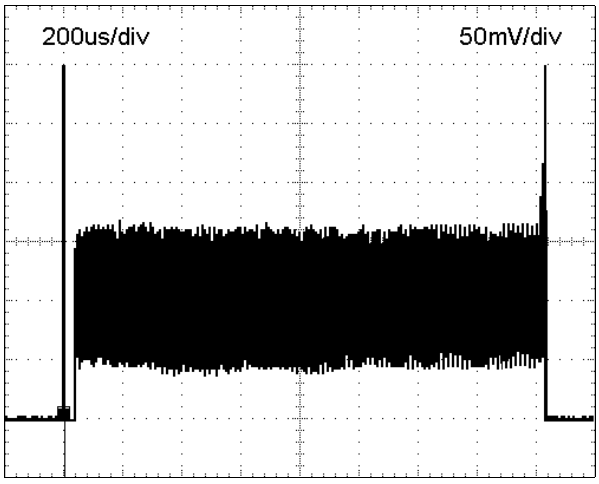
When all camera adjustments have been completed, run Test 16, Basic Calibration (or WIDEimage, Calibrate Scanner).



Camera A Focus Signal, Blue Corrected

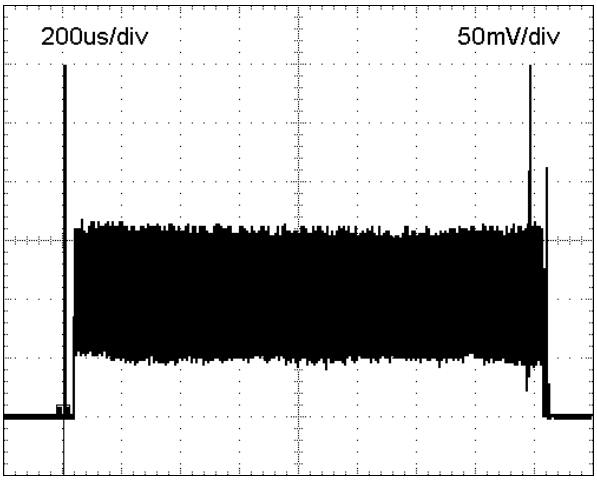


Camera B Focus Signal, Blue Corrected

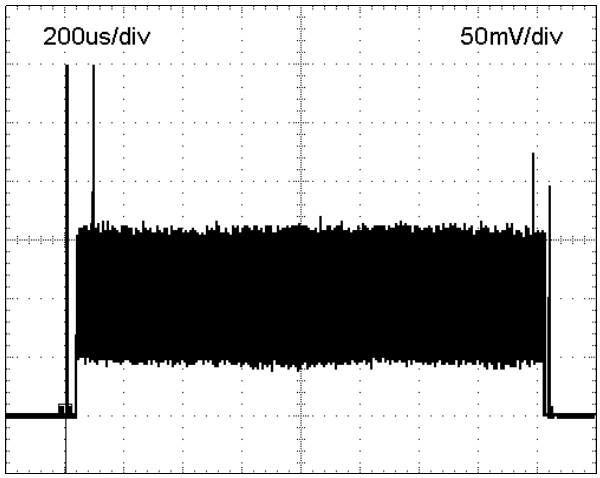


Camera C Focus Signal, Blue Corrected

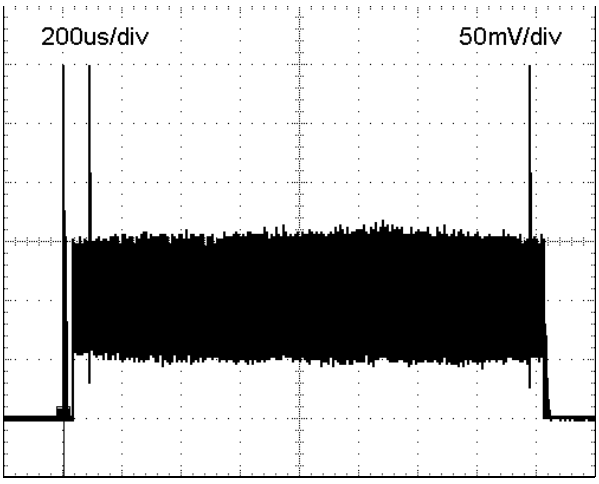
Fig. 4-9 FSC x040 CHROMA Focus Signals



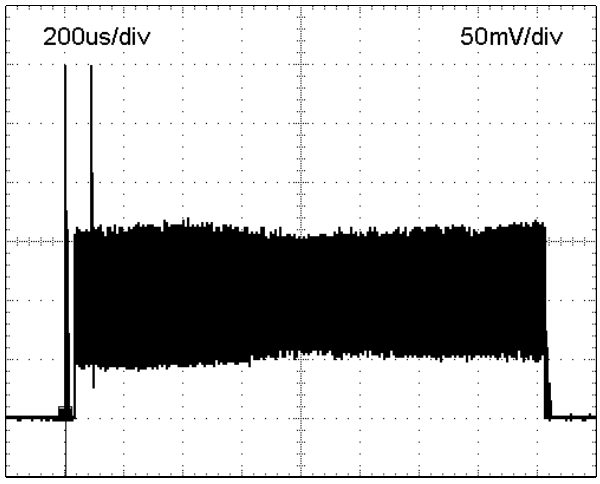
Camera A Focus Signal, Blue Corrected



Camera B Focus Signal, Blue Corrected

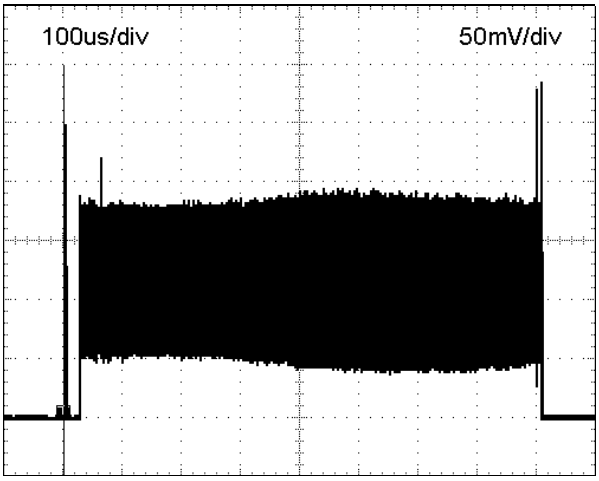


Camera C Focus Signal, Blue Corrected

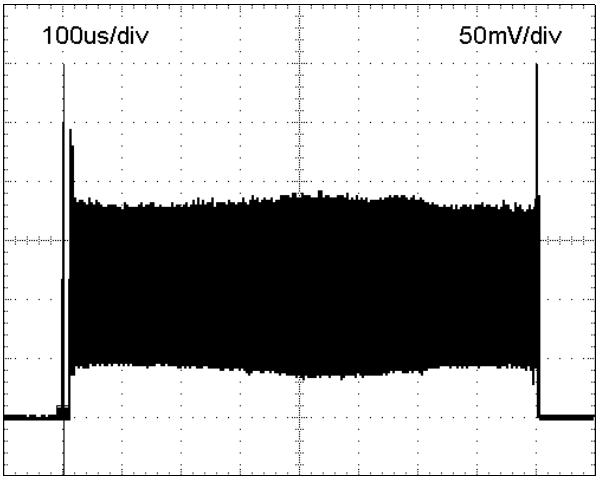


Camera D Focus Signal, Blue Corrected

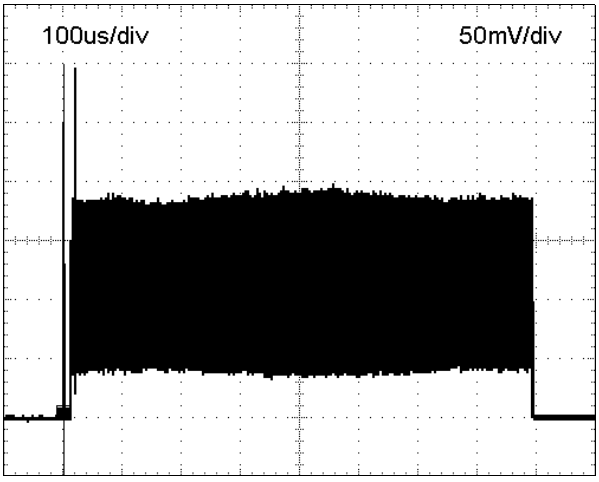
Fig. 4-10 FSC x050 MAGNUM Focus Signals



Camera A Focus Signal



Camera B Focus Signal



Camera C Focus Signal

Fig. 4-11 FSS 225x PANORAMA, CRYSTAL 40 Focus Signals

4.2.3 Scan-Width

Oscilloscope images of the Scan-Width adjustments are shown in:

Fig. 4-12 FSC x040 CHROMA, Scan-Width, page 79
Fig. 4-13 FSC x050 MAGNUM, Scan-Width (1), page 80
Fig. 4-14 FSC x050 MAGNUM, Scan-Width (2), page 81
Fig. 4-15 FSS 225x PANORAMA, CRYSTAL 40, Scan-Width, page 82

The aim of this adjustment is to obtain a camera Scan-Width of:

FSC x040 CHROMA:	343.98 / 349.28 / 343.98 mm
FSC x050 MAGNUM:	336.55 mm for all cameras
FSS 225x PANORAMA:	430.02 / 436.70 / 430.02 mm
CRYSTAL 40:	430.02 / 436.70 / 430.02 mm

The Scan-Width is correct if the total sum of Scan-Width Units (SWU) at the start and at the end of the scanline is as shown in the table below (*1 SWU is either 1 Black Line or 1 White Space of the Scan-Width Pattern (A)*).

Model	Optical Adjustment Pattern	Total sum of Scan-Width Units	Tolerance
FSC x040 CHROMA	6799A130, sub-pattern A	6	±0.5 SWU
FSC x050 MAGNUM	6799A103, sub-pattern A	6	±0.5 SWU
FSS 225x PANORAMA	6799A135, sub-pattern A	6	±0.5 SWU
CRYSTAL 40	6799A135, sub-pattern A	6	±0.5 SWU

Adjustment Procedure

Always do the Focus adjustment before adjusting the Scan-Width, see “Interaction” below.

All measurements are relative to test point GND.

Place the Optical Adjustment Pattern (see table above) in the scan-area.

Align the Adjustment Pattern by pushing it sideways towards the Operator Panel and towards the rear of the scanner.

Connect the oscilloscope to test point ANALOG_OUT on the CBC/CBB-Board and trigger to test point ENSHFT on the SUA-Board, see Fig. 4-20, page 90.

Start SCANtest 4

Select Test 9

Select Uncorrected Light Profile (default)

Select Scan Green (MAGNUM and CHROMA only)

Loosen the Camera fixing screws (3 pcs.) and the Camera Back-Plate fixing screws (3 pcs.), see Fig. 4-21, page 91. The screws should just be loosened enough to allow the Camera and the Camera Back-Plate to be moved.

Adjust the Scan-Width by turning the Scan-Width Adjustment Screw (which moves the Camera back and forth) to get the correct total sum of Scan-Width Units, see the table above (at least 1 black line must be clearly visible at the start as well as at the end of the scanline). One full turn of the Scan-Width Adjustment Screw changes the Scan-Width approximately 0.5 SWU.

Tighten the Camera fixing screws. Make sure that the Camera is kept aligned by gently pushing it forward and to the left before tightening the screws.

Interaction
Check Focus and readjust if necessary.
The Focus adjustment has a big influence on the Scan-Width adjustment. Therefore the Scan-Width must be checked and readjusted if necessary when the Focus adjustment has been changed. On the other hand, the Focus adjustment is relative tolerant to changes in the Scan-Width adjustment and as a rule of thumb, the Scan-Width adjustment can be changed ±1 SWU without the need for re-focusing.

When all camera adjustments have been completed, run Test 16, Basic Calibration (or WIDEimage, Calibrate Scanner).

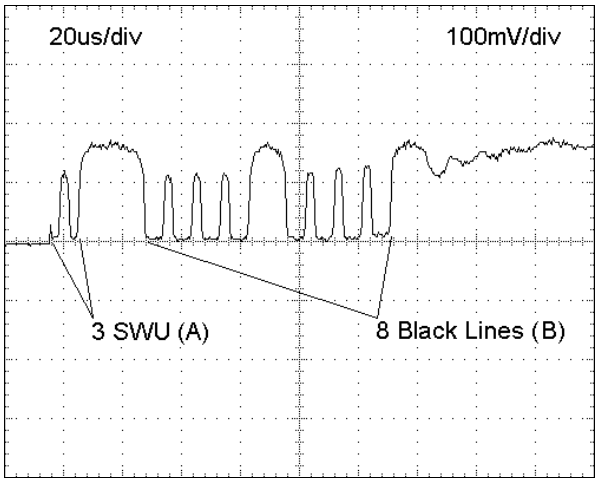
Note
The horizontal (X-axis) accuracy of the scanner depends on the distance between camera and scan-area.

Scaling errors may be corrected as follows:

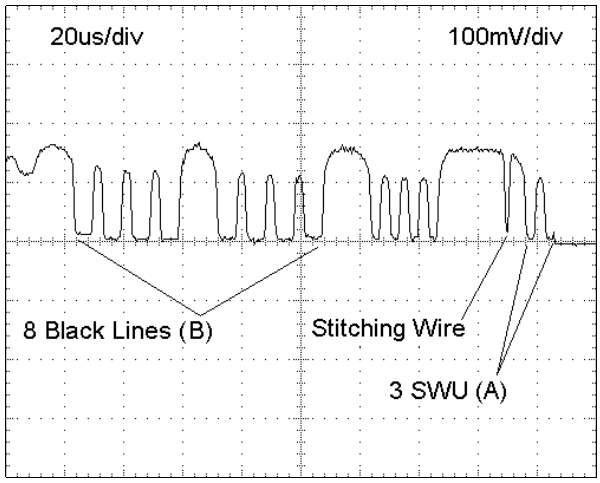
If the scanned image is too big:
Turn the Scan-Width Adjustment Screw CW (increase the Scan-Width)

If the scanned image is too small:
Turn the Scan-Width Adjustment Screw CCW (decrease the Scan-Width)

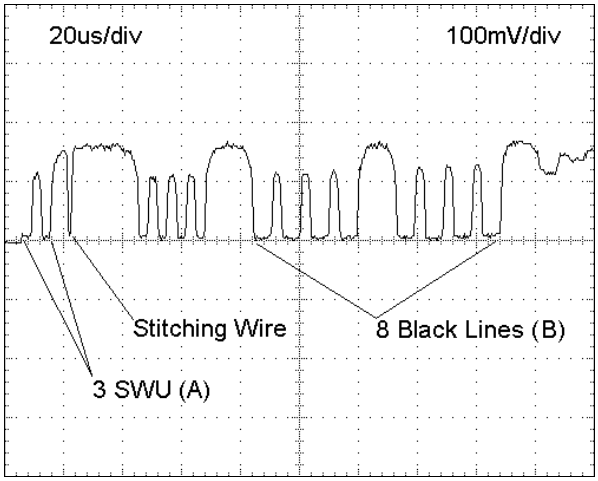
The Scan-Width Adjustment Screw should be turned approx. 1 turn per 0.1% error.



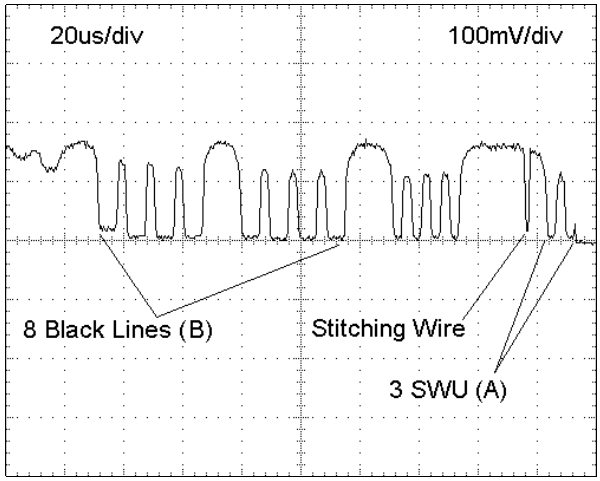
Camera A, Scanline Start



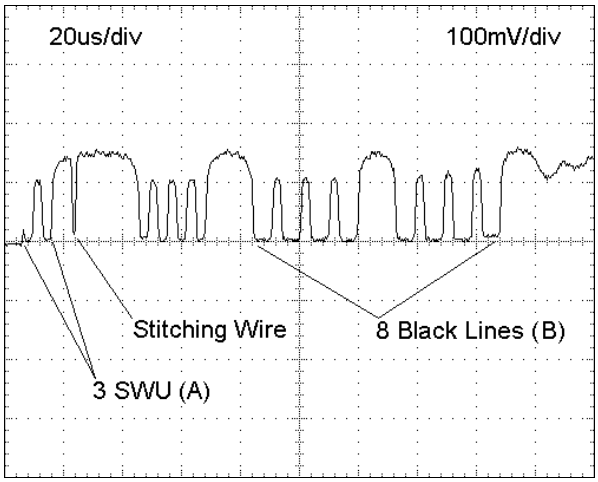
Camera A, Scanline End



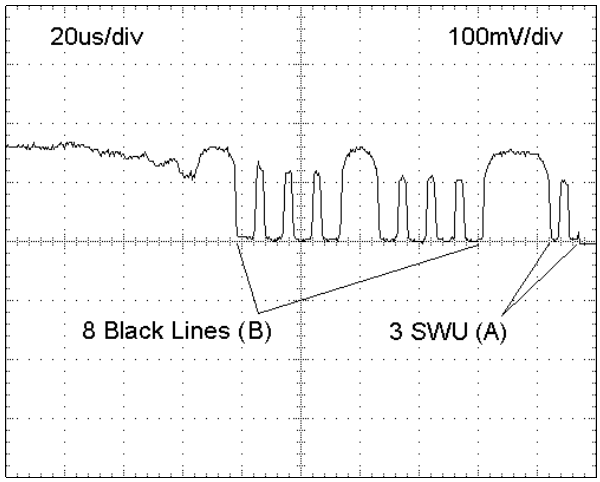
Camera B, Scanline Start



Camera B, Scanline End

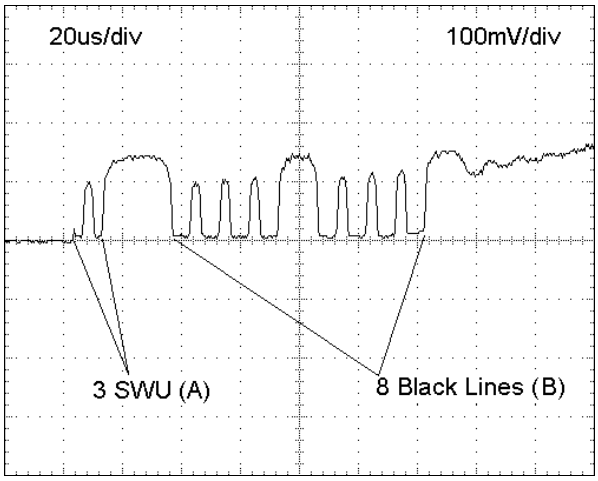


Camera C, Scanline Start

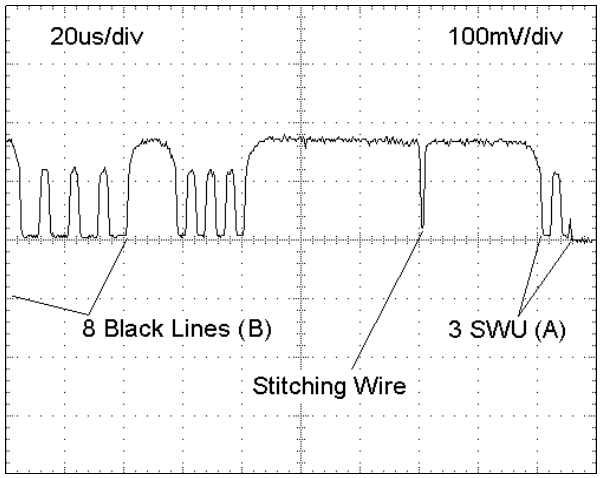


Camera C, Scanline End

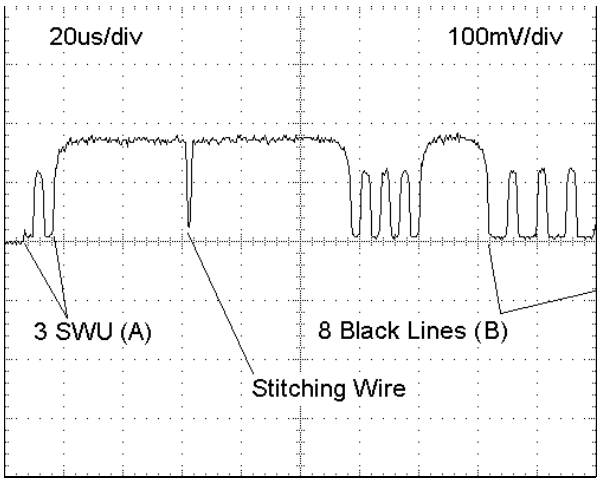
Fig. 4-12 FSC x040 CHROMA, Scan-Width



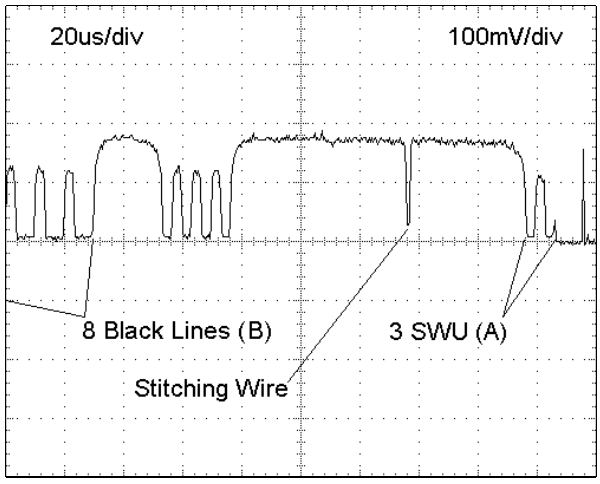
Camera A, Scanline Start



Camera A, Scanline End

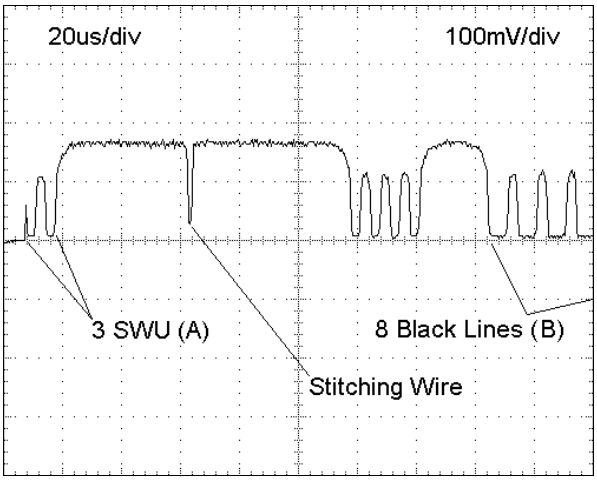


Camera B, Scanline Start

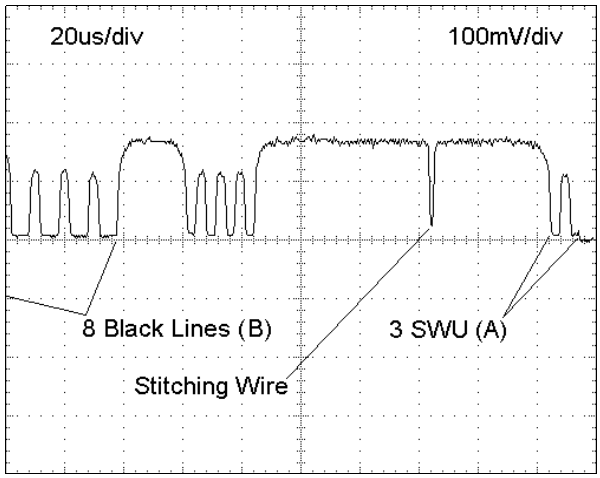


Camera B, Scanline End

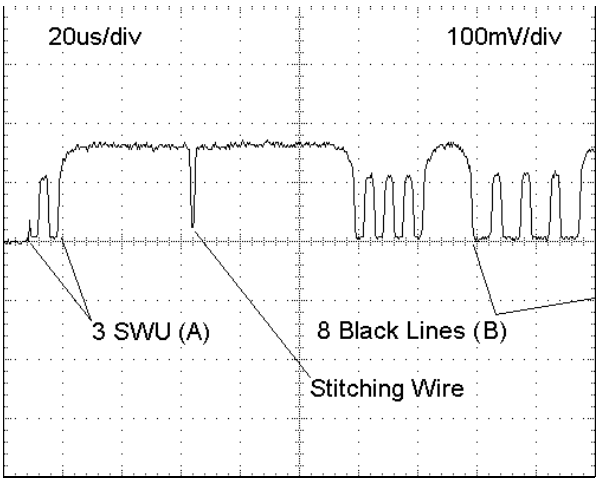
Fig. 4-13 FSC x050 MAGNUM, Scan-Width (1)



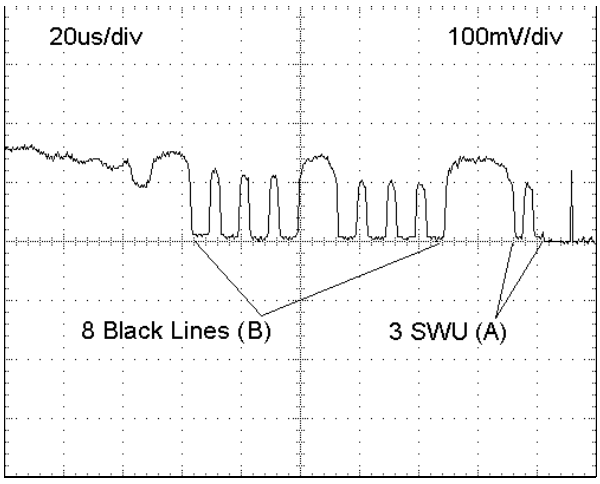
Camera C, Scanline Start



Camera C, Scanline End

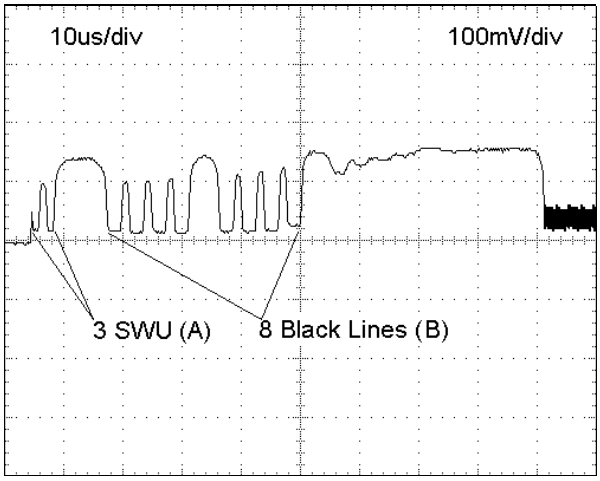


Camera D, Scanline Start

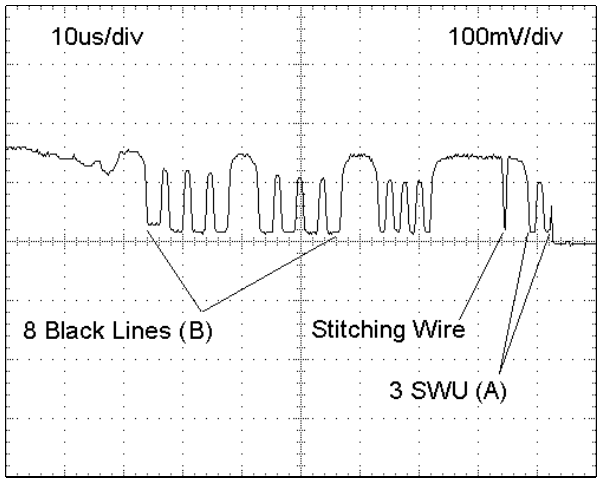


Camera D, Scanline End

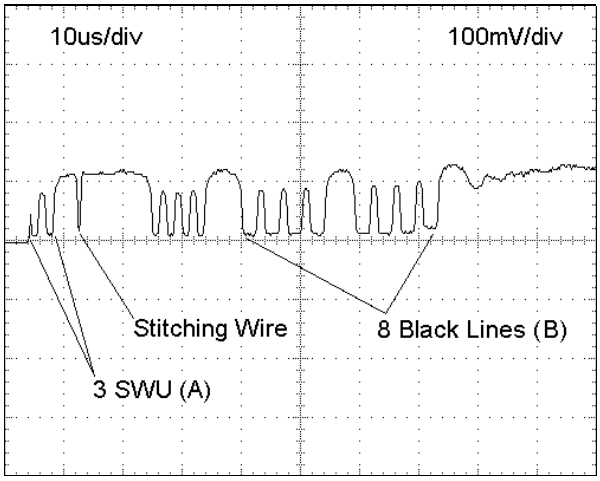
Fig. 4-14 FSC x050 MAGNUM, Scan-Width (2)



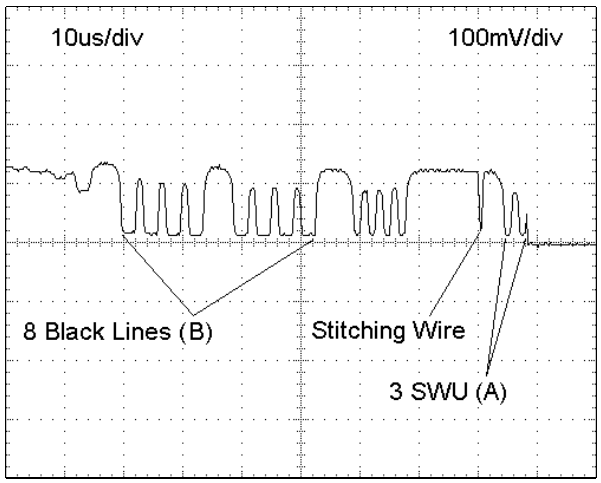
Camera A, Scanline Start



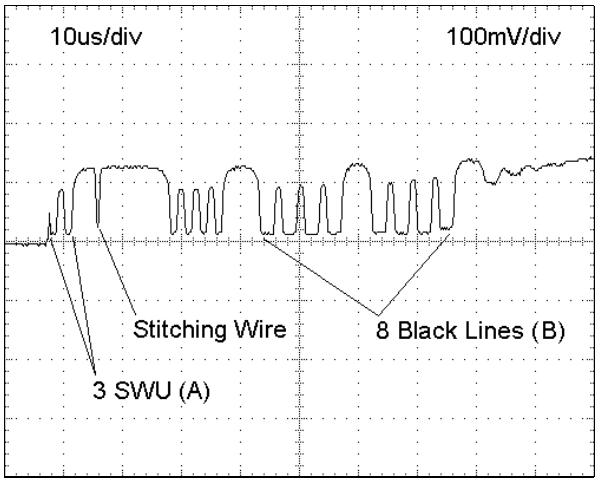
Camera A, Scanline End



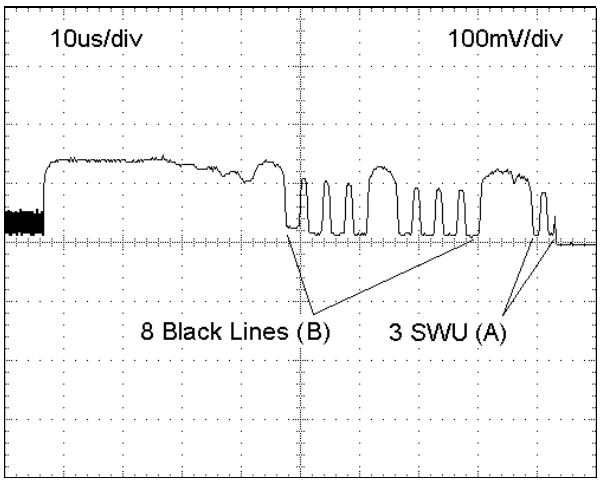
Camera B, Scanline Start



Camera B, Scanline End



Camera C, Scanline Start



Camera C, Scanline End

Fig. 4-15 FSS 225x PANORAMA, CRYSTAL 40, Scan-Width

4.2.4 CCD-Centering

Oscilloscope images of the CCD-Centering adjustments are shown in:

Fig. 4-16 FSC x040 CHROMA, CCD-Centering and Vertical Positioning, page 86
Fig. 4-17 FSC x050 MAGNUM, CCD-Centering and Vertical Positioning (1), page 87
Fig. 4-18 FSC x050 MAGNUM, CCD-Centering and Vertical Positioning (2), page 88
Fig. 4-19 FSS 225x PANORAMA, CRYSTAL 40, CCD-Centering and Vertical Positioning, page 89

The aim of this adjustment is to position the field of vision of the CCD-Camera symmetrically with respect to the Scan-Width Adjustment Patterns.
The Black Lines and White Spaces of the Scan-Width Patterns should be distributed symmetrically with the following number of Scan-Width Units at both ends of the scanline:

Model	Optical Adjustment Pattern	No of Scan-Width Units, start	No of Scan-Width Units, end	Tolerance
FSC x040 CHROMA	6799A130, sub-pattern A	3	3	± 1 SWU
FSC x050 MAGNUM	6799A103, sub-pattern A	3	3	± 1 SWU
FSS 225x PANORAMA	6799A135, sub-pattern A	3	3	± 1 SWU
CRYSTAL 40	6799A135, sub-pattern A	3	3	± 1 SWU

The tolerance on the CCD-Centering means that the image may be shifted ± 1 SWU.
Note: The total number of Scan Width Units must be 6 ± 0.5, see Section 4.2.3, page 77.

Adjustment Procedure

Place the Optical Adjustment Pattern (see table above) in the scan-area.

Align the Adjustment Pattern by pushing it sideways towards the Operator Panel and towards the rear of the scanner.

Connect the oscilloscope to test point ANALOG_OUT on the CBC/CBB-Board and trigger to test point ENSHFT on the SUA-Board, see Fig. 4-1, page 90.

Start SCANtest 4

Select Test 9

Select Uncorrected Light Profile (default)

Select Scan Green (MAGNUM and CHROMA only)

Loosen the Camera Back-Plate fixing screws (3 pcs.), see Fig. 4-21, page 91, the screws should just be loosened enough to allow the Camera Back-Plate to be moved.

Adjust the horizontal position of the Camera Back-Plate by means of the CCD Centering Lever until the oscilloscope image shows the correct number of Scan-Width Units of the actual sub-pattern at the start and at the end of the scanline.

Tighten the Camera Back-Plate fixing screws.

Interaction
Check Vertical Position.
After completing all camera adjustments, run Test 16, Basic Calibration (or WIDEimage, Calibrate Scanner).

4.2.5 Vertical Positioning

Oscilloscope images of the Vertical Positioning adjustments are shown in:

Fig. 4-16 FSC x040 CHROMA, CCD-Centering and Vertical Positioning, page 86
Fig. 4-17 FSC x050 MAGNUM, CCD-Centering and Vertical Positioning (1), page 87
Fig. 4-18 FSC x050 MAGNUM, CCD-Centering and Vertical Positioning (2), page 88
Fig. 4-19 FSS 225x PANORAMA, CRYSTAL 40, CCD-Centering and Vertical Positioning, page 89

The aim of this adjustment is to place the scanline in the correct “Vertical Position” within the scan-area, and to ensure that the scanline is “horizontal”.

The Vertical Positioning of the CCD-Cameras is based on the number of black lines of the Vertical Position Pattern that crosses the scanline.

Adjustment Procedure

All measurements are relative to test point GND.

Place the Optical Adjustment Pattern (see table above) in the scan-area.

Align the Adjustment Pattern by pushing it sideways towards the Operator Panel and towards the rear of the scanner.

Connect the oscilloscope to test point ANALOG_OUT on the CBC/CBB-Board and trigger to test point ENSHFT on the SUA-Board, see Fig. 4-20, page 90.

Start SCANtest 4

Select Test 9

Select Uncorrected Light Profile (default)

Select Scan Green (MAGNUM and CHROMA only)

Loosen the Camera Back-Plate fixing screws (3 pcs.). The screws should just be loosened enough to allow the Camera Back-Plate to be moved.

Adjust the Vertical Tilt Levers to get 8 Black Lines of the Vertical Position Patterns at both ends of the scanline, and at the same time maintain correct CCD-Centering.

If 8 Black Lines at both ends can not be obtained:

Loosen the lock screw for the Vertical Alignment Arm, and the lock screw for Vertical Position Adjustment on Camera B, see Fig. 4-21, page 91 (the earliest MAGNUM scanners have no lock screw).
Set the Vertical Tilt Levers to approximately horizontal position, and adjusted for the same number of Black Lines at both ends of the scanline.

Adjust the Vertical Position Pre-Set Screw to get 8 Black Lines at both ends.

Tighten lock screw for Vertical Position Adjustment on Camera B (the earliest MAGNUM scanners have no lock screw).

Tighten the Camera Back-Plate fixing screws, while maintaining the 8 Black Lines at both ends of the scanline.

Turn the Vertical Alignment Screw until the Vertical Alignment Arm is in mid position.

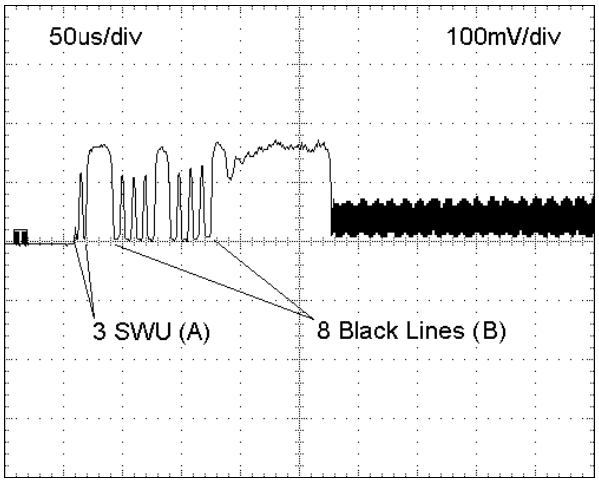
Tighten the lock screw for the Vertical Alignment Arm.

Interaction
After completing all camera adjustments, run Test 16, Basic Calibration (or WIDEimage, Calibrate Scanner).

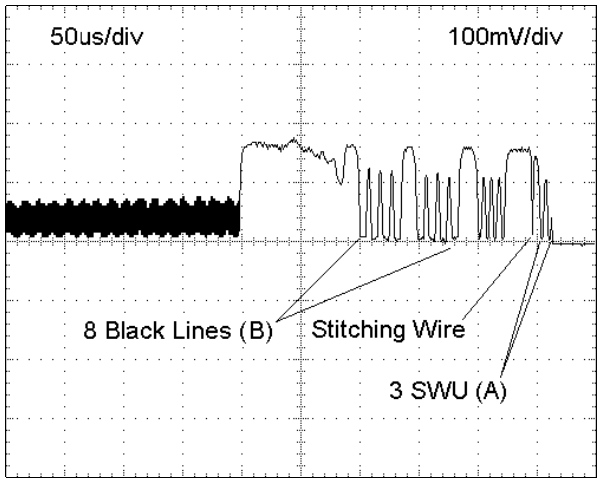
4.2.6 Final Check

As the above adjustments interact:

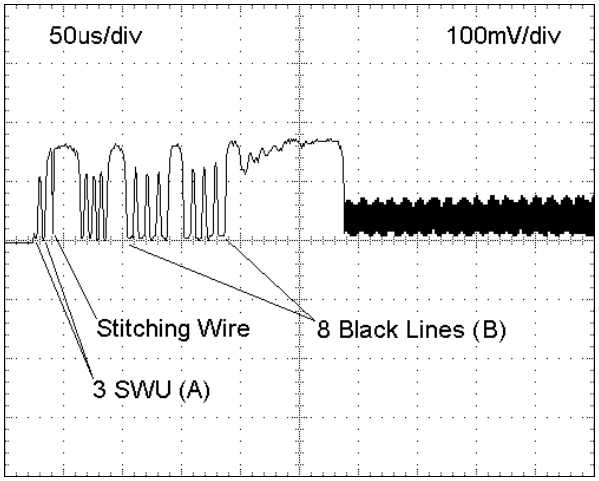
Check, and if necessary readjust steps 4.2.2 through 4.2.6



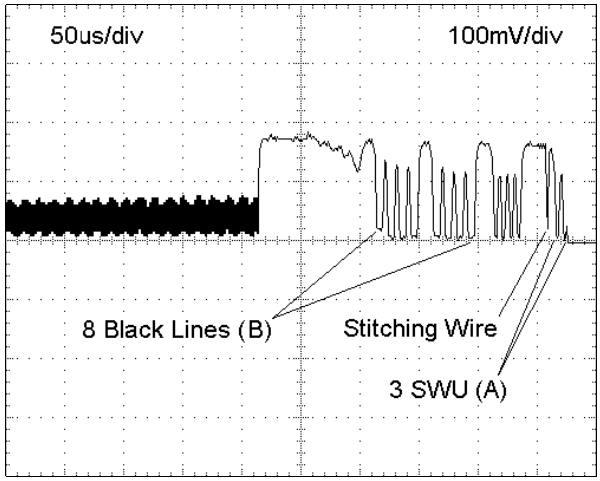
Camera A, Scanline Start



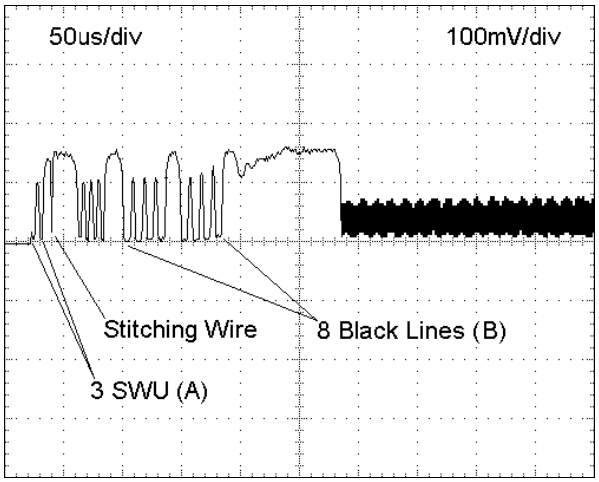
Camera A, Scanline End



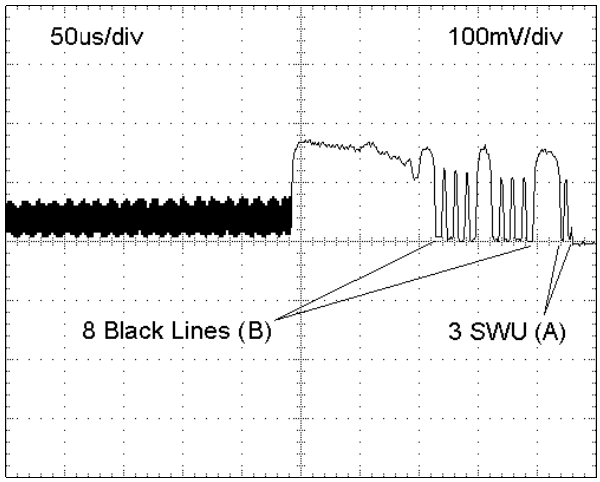
Camera B, Scanline Start



Camera B, Scanline End

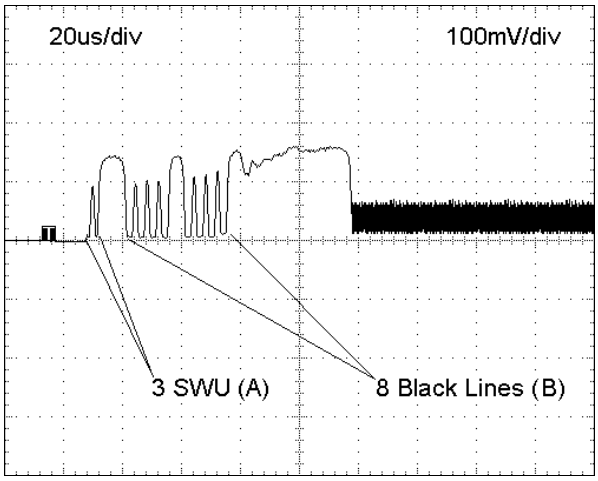


Camera C, Scanline Start

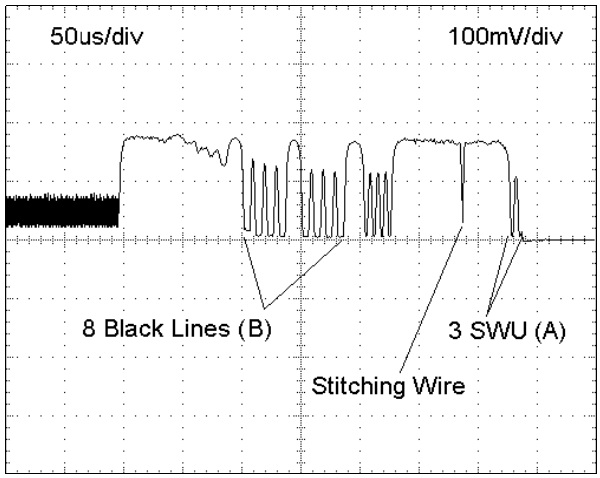


Camera C, Scanline End

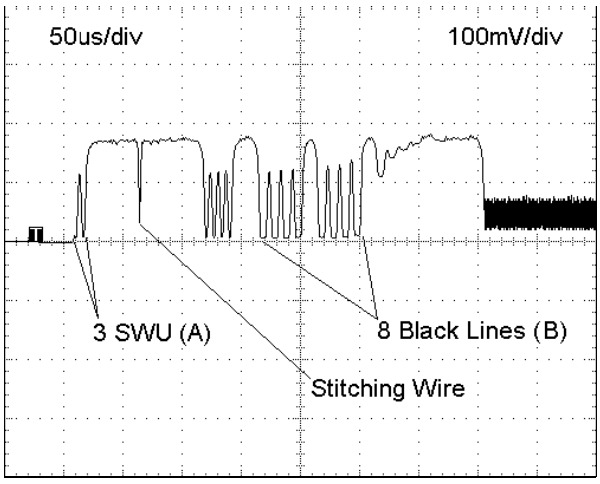
Fig. 4-16 FSC x040 CHROMA, CCD-Centering and Vertical Positioning



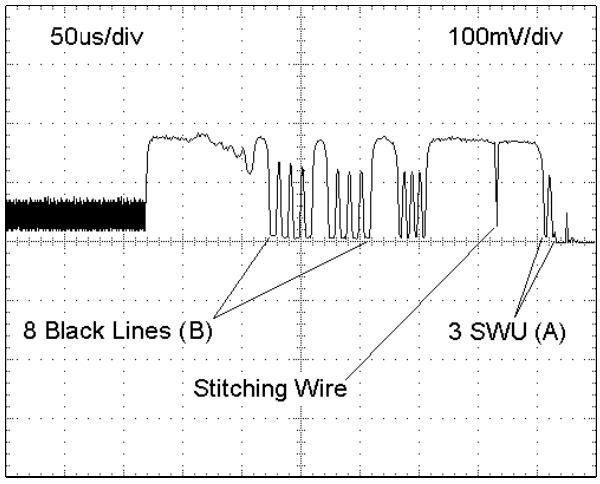
Camera A, Scanline Start



Camera A, Scanline End

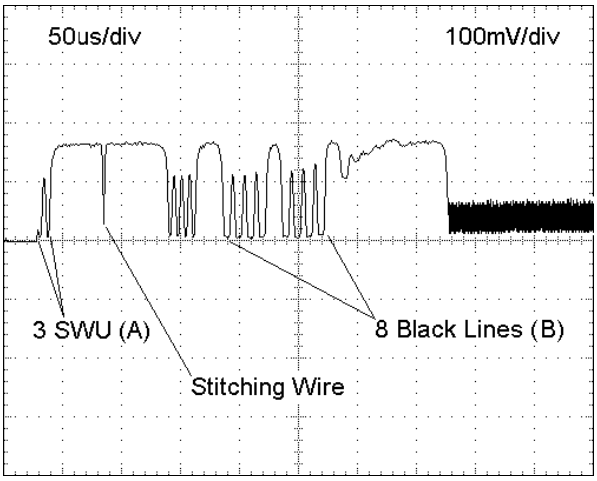


Camera B, Scanline Start

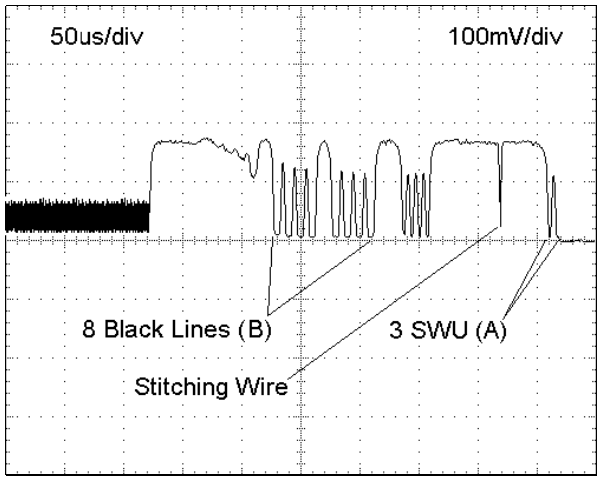


Camera B, Scanline End

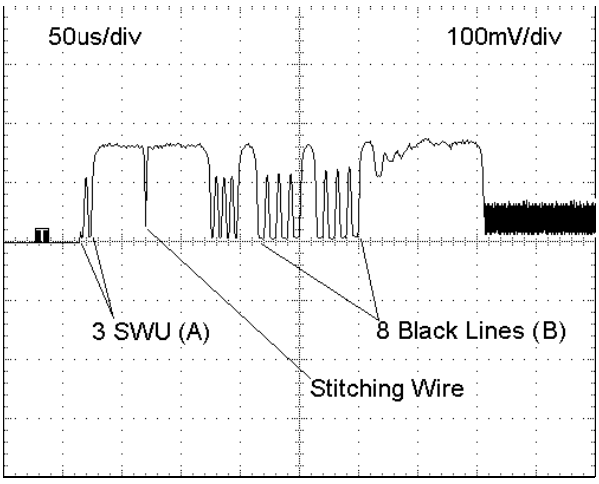
Fig. 4-17 FSC x050 MAGNUM, CCD-Centering and Vertical Postioning (1)



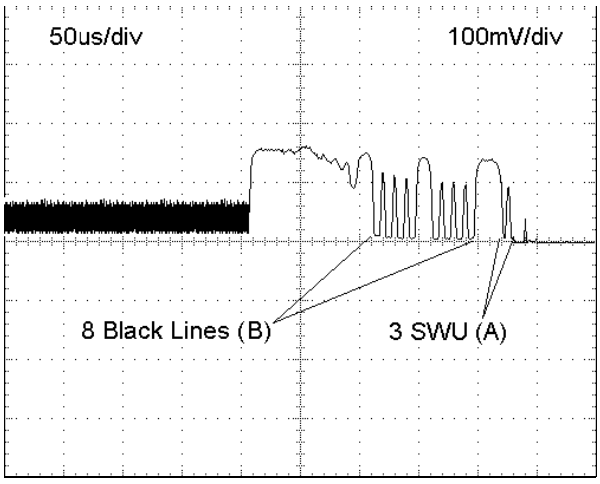
Camera C, Scanline Start



Camera C, Scanline End

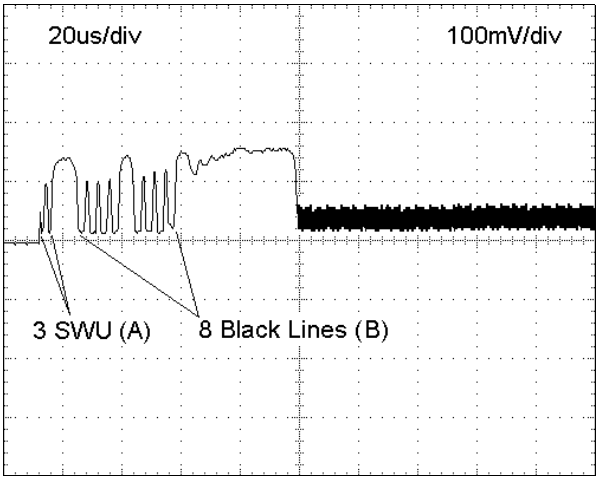


Camera D, Scanline Start

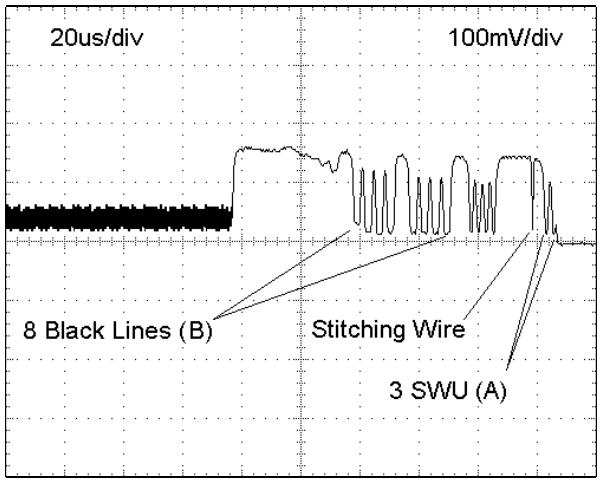


Camera D, Scanline End

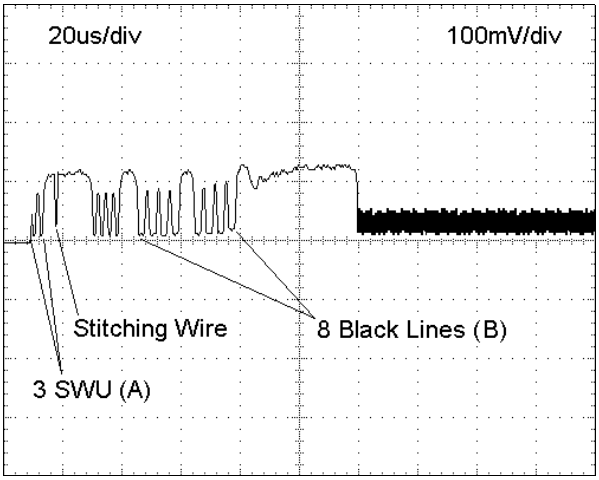
Fig. 4-18 FSC x050 MAGNUM, CCD-Centering and Vertical Postioning (2)



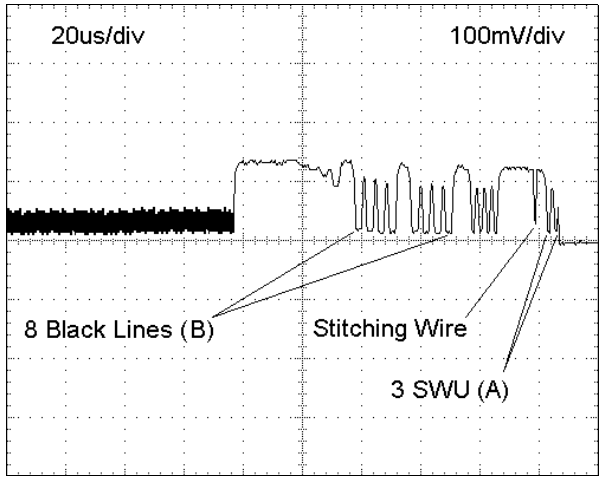
Camera A, Scanline Start



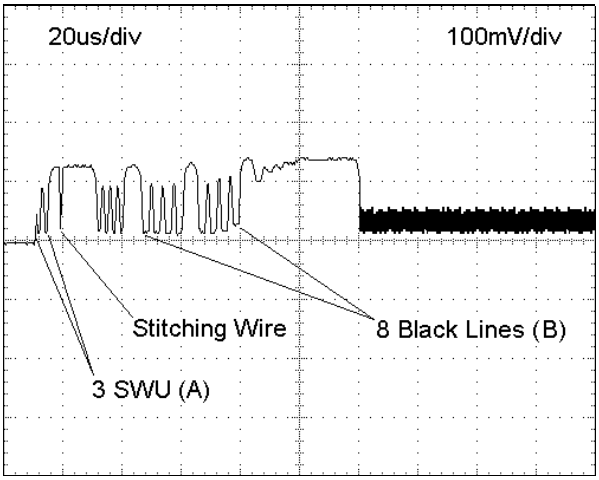
Camera A, Scanline End



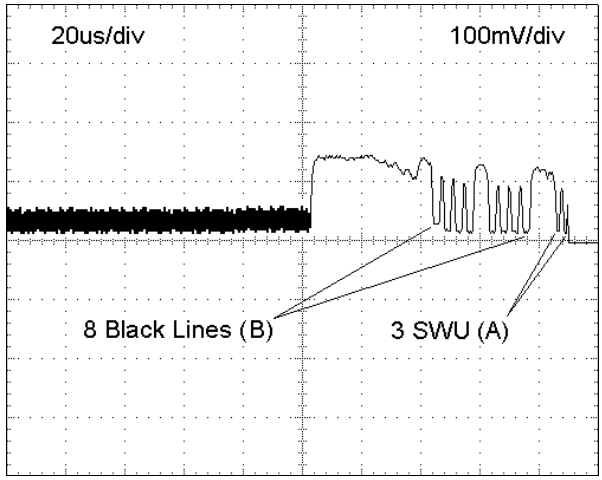
Camera B, Scanline Start



Camera B, Scanline End



Camera C, Scanline Start



Camera C, Scanline End

Fig. 4-19 FSS 225x PANORAMA, CRYSTAL 40, CCD-Centering and Vertical Positioning

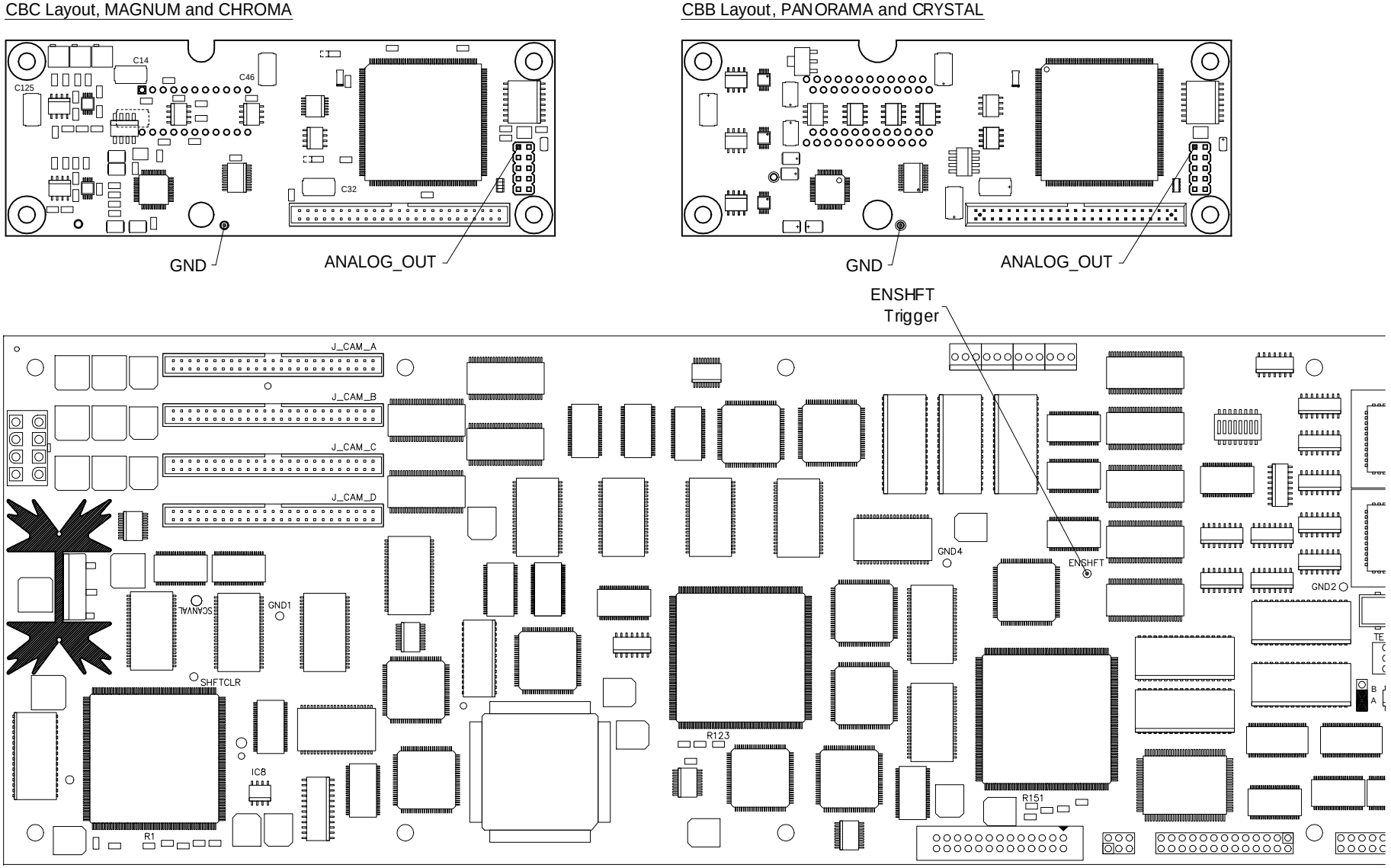


Fig. 4-20 Test Points for Camera Adjustments

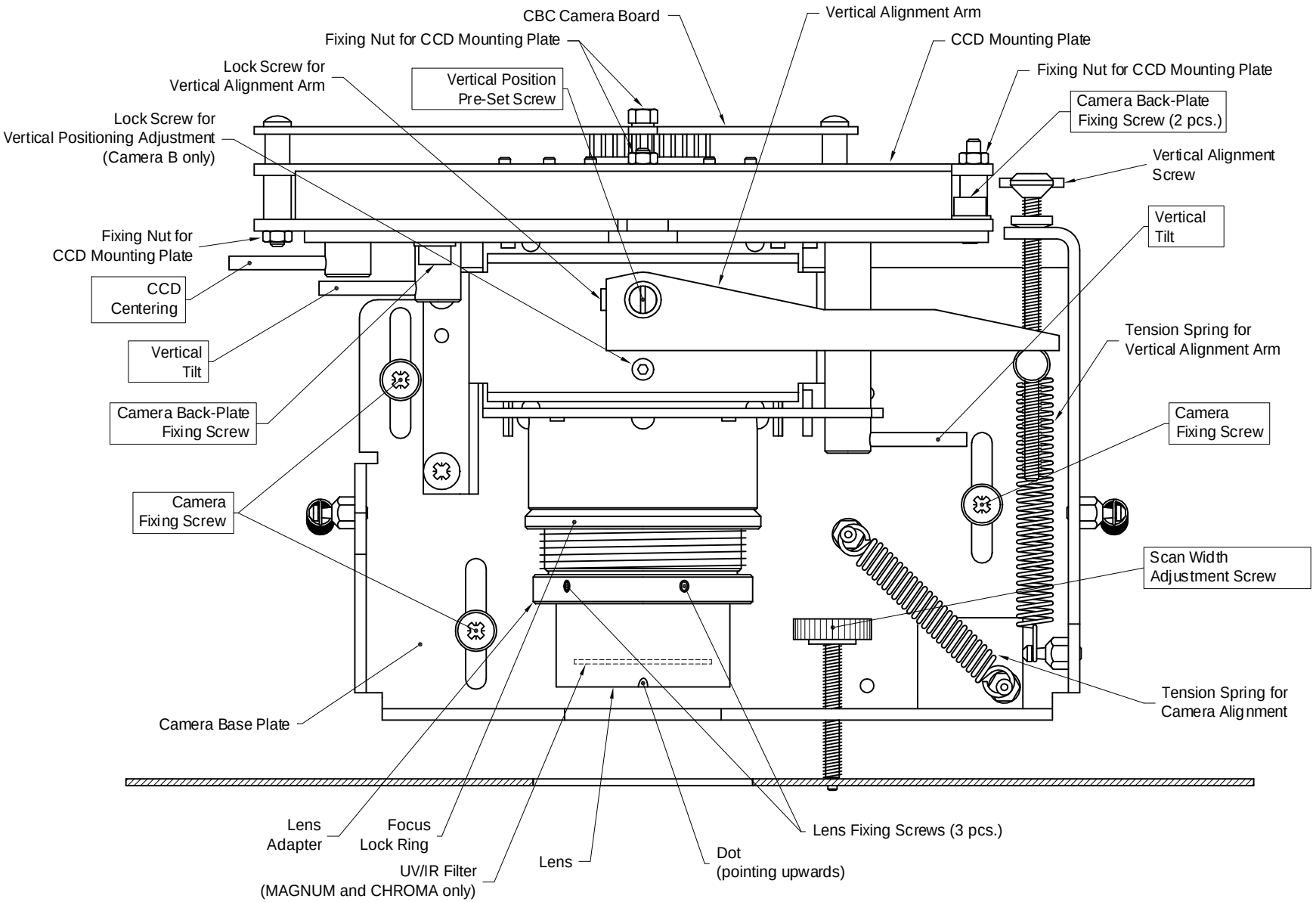
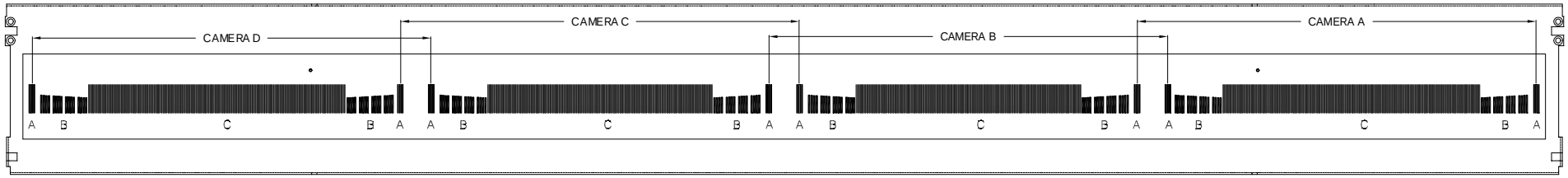
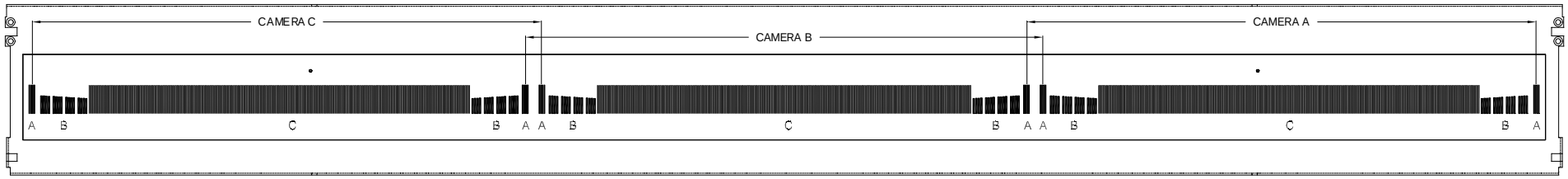


Fig. 4-21 CCD-Camera, Top View

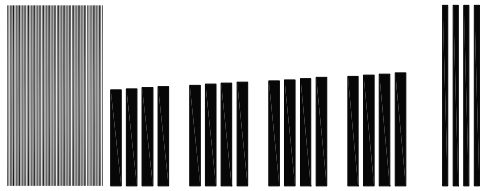
FSC x040 CHROMA Optical Adjustment Pattern



FSC x050 MAGNUM Optical Adjustment Pattern



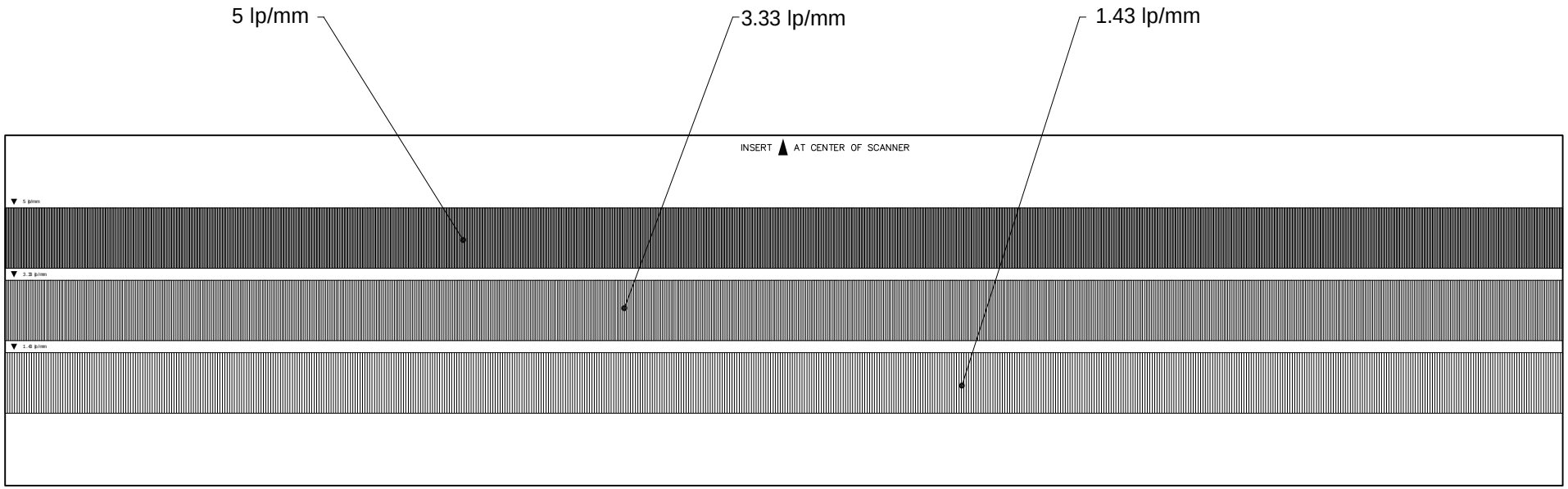
FSS 225x PANORAMA, CRYSTAL 40 Optical Adjustment Pattern



Detail A-A

Sub-pattern A: Scan-Width Patterns
Sub-pattern B: Vertical Position Patterns
Sub-pattern C: Focus Pattern (used for coarse Focus adjustment)

Fig. 4-22 Optical Adjustment Patterns



Upper Pattern: 0.1mm black lines with 0.1mm spacing (5 lp/mm)

Center Pattern: 0.15mm black lines with 0.15mm spacing (3.33 lp/mm)

Lower Pattern: 0.35mm black lines with 0.35mm spacing (1.43 lp/mm)

Fig. 4-23 Focus Pattern

5. Stitching and Vertical Alignment

5.1 Principle of Stitching

The following description refers to the Stitching of Camera A and Camera B, but it applies for other adjacent cameras as well.

As shown in the Scanner Block Diagrams in Section 2.1, the fields of vision of adjacent cameras overlap.
The Stitching Wire is placed within the 'overlapped' area and is seen by both CCD-Cameras. The scanned image of the Stitching Wire is used to determine the virtual end point of Scanline A and the virtual start point of Scanline B.
The pixel stream from Camera A is stopped N_A pixels before the image of the Stitching Wire, and the pixel stream from Camera B is started N_B pixels after the image of the Stitching Wire. As illustrated by Fig. 5-1, page 96, the Stitching depends on the distance between the Stitching Wire and the Original as well as on the size of N_A and N_B.

Whenever the scanner is idle, the Stitching is continuously updated (see Sec. 2.5.3, page 19) and corrected for relative changes in the position of the Stitching Wire parallel to the glass plate. If the position of the Stitching Wire is changed perpendicular to the glass plate, the Stitch values, which are stored in Flash Memory on the SUA-Board, must be corrected using SCANtest 4, Test 11.
The mounting of the Stitching Wire is shown in Fig. 5-2, page 97.

5.2 Stitching Adjustment

The Stitching Adjustment is based on scanning of the

Stitching Adjustment Chart 6699D116

using SCANtest 4, Test 11 and adjusting the virtual end point (N_A), respectively start point (N_B), of the scanlines from adjacent cameras.

The Stitching is correct when the lines of the hatch-pattern (and the horizontal line) are continuous, and the ruler contains 10 sub-divisions of equal size across the stitching area.

Adjustment Procedure

The Vertical Position of the cameras must be aligned before adjusting the Stitching, see the next section.

Start	SCANtest 4
Select	Test 11
Insert	Stitching Adjustment Chart
Select	Stitching Area to start scanning

To set the Stitch Value:

- Scan the Stitching Adjustment Chart
- Select New Stitch Value and adjust the value

5.2.1 Vertical Alignment

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

Select Stitching Area to start scanning

If the horizontal line (located between the ruler and the hatch-pattern) is discontinuous:

Select Alignment

And turn the Vertical Alignment Screw to make the line continuous.

The Vertical Position of the cameras may change as the scanner warms up. To get the best results, it is recommended to adjust the Vertical Position of the cameras one hour after the scanner has been switched ON, and to switch the scanner ON one hour before scanning.

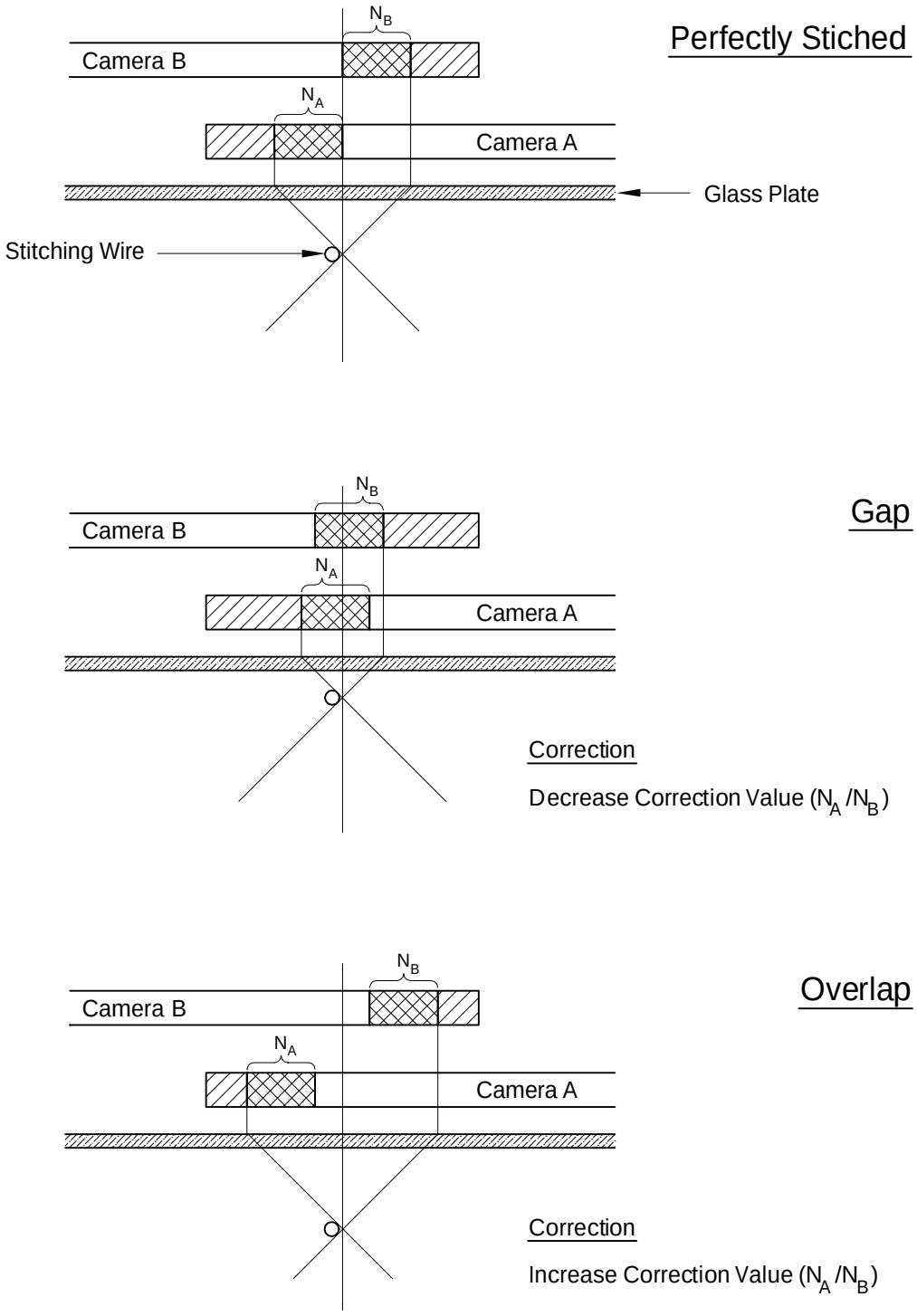


Fig. 5-1 Principle of Stitching

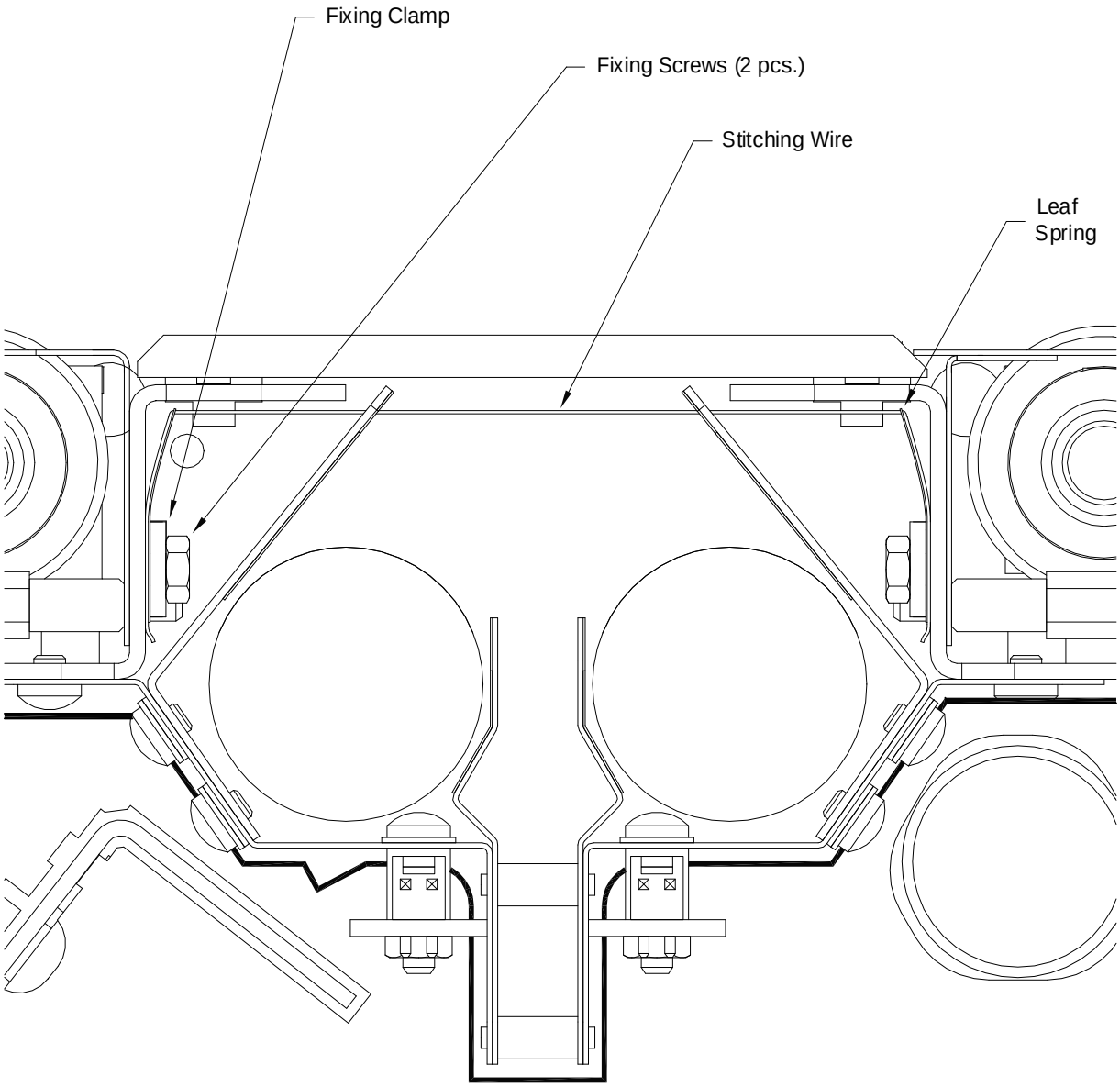


Fig. 5-2 Stitching Wire Mounting

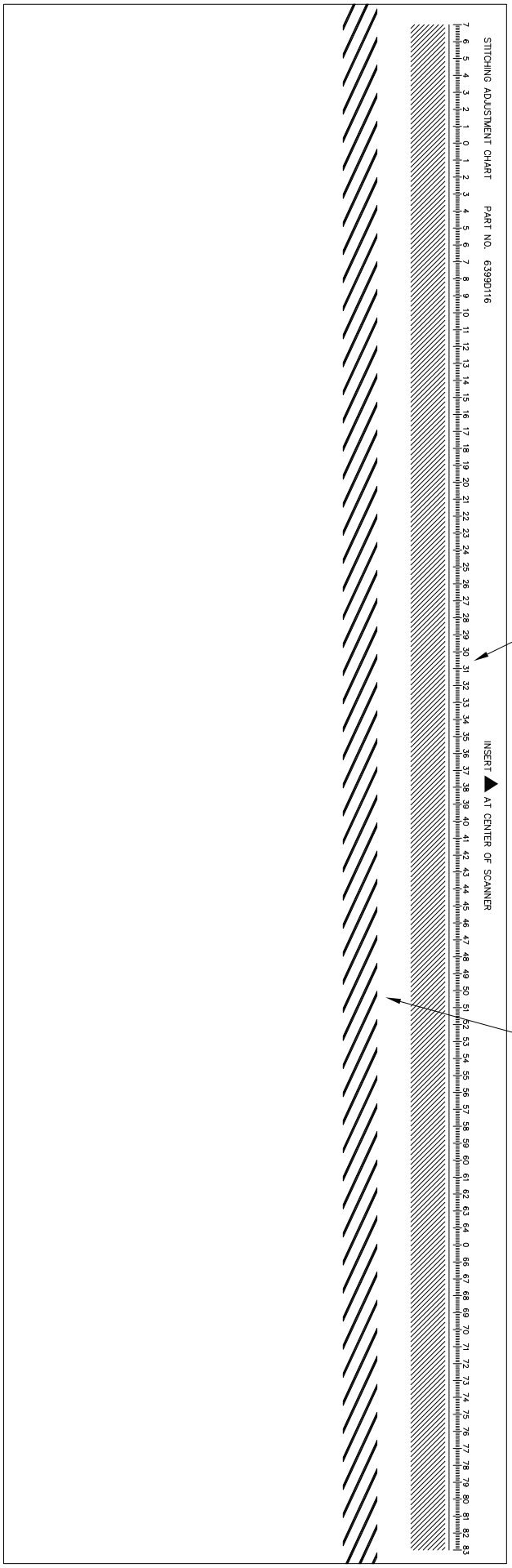


Fig. 5-3 Stitching Adjustment Chart

5.3 Stitching and Vertical Alignment

5.3.1 FSC x040 CHROMA

The above model has three CCD-Cameras, referred to from right to left as Camera A, Camera B, and Camera C. The Vertical Position of Camera B is set internally, whereas the Vertical Position of the two other cameras can be adjusted through holes behind the Model Streamer.

The cameras must be aligned vertically before the Stitching is adjusted.

Vertical Position Alignment of Camera A and C

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

Select Stitching Area to start scanning

If the horizontal line between the ruler and the hatch-pattern is discontinuous at the transition Camera A/B or Camera B/C:

Select Alignment

Turn the Vertical Alignment Screw on Camera A

Clockwise (CW):	Left Side on screen moves up.
Counter-Clockwise (CCW):	Left Side on screen moves down.

Turn the Vertical Alignment Screw on Camera C

Clockwise (CW):	Right Side on screen moves up.
Counter-Clockwise (CCW):	Right Side on screen moves down.

By consecutive adjustment and scanning make the horizontal line continuous.

Stitching Adjustment

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

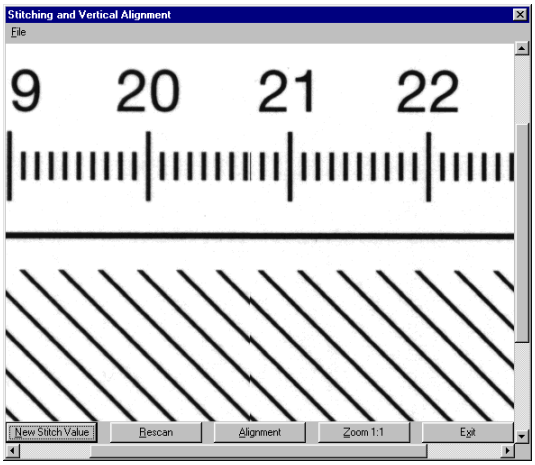
Select Stitching Area to start scanning

If the lines of the hatch-pattern are discontinuous at the transition Camera A/B or Camera B/C and the sub-divisions of the ruler are not equal, adjust the Stitch Value:

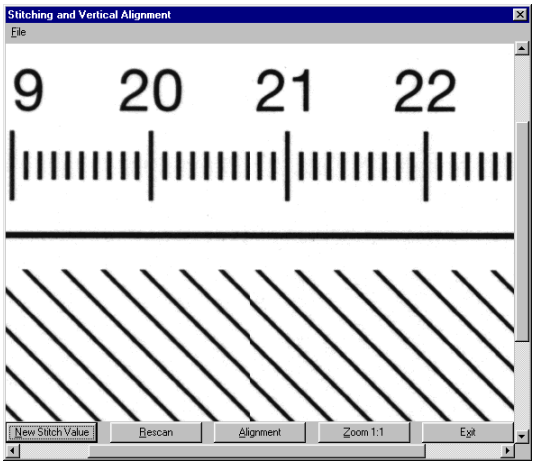
- A larger Stitch Value decreases the size of the ruler sub-division
- A smaller Stitch Value increases the size of the ruler sub-division

By consecutive adjustment and scanning make the lines of the hatch-pattern continuous and ruler sub-division equal.

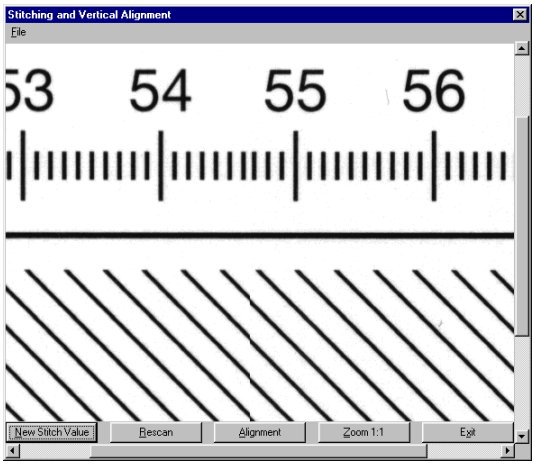
See Fig. 5-4, page 101.



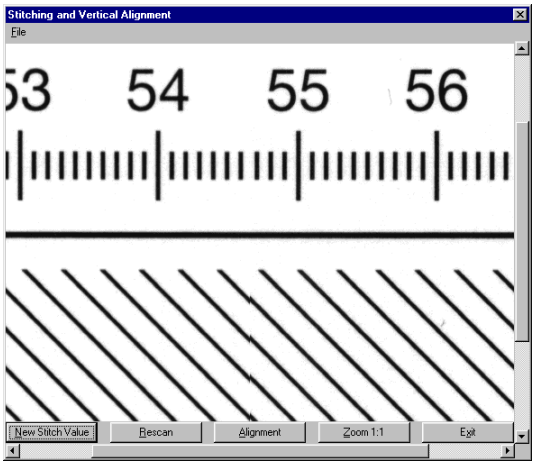
Camera A/B, Overlap
Correct by Increasing Stitching Value



Camera A/B, Gap
Correct by Decreasing Stitching Value



Camera B/C, Overlap
Correct by Increasing Stitching Value



Camera B/C, Gap
Correct by Decreasing Stitching Value

Fig. 5-4 FSS x040 CHROMA Stitching Images

5.3.2 FSC x050 MAGNUM

The above model has four CCD-Cameras, referred to from right to left as Camera A, Camera B, Camera C, and Camera D. The Vertical Position of Camera B is set internally, whereas the Vertical Position of the three other cameras can be adjusted through holes behind the Model Streamer.

The cameras must be aligned vertically before the Stitching is adjusted, and Camera C must be aligned before aligning Camera D.

Vertical Position Alignment of Camera A, C, and D

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

Select Stitching Area to start scanning

If the horizontal line between the ruler and the hatch-pattern is discontinuous at the transition Camera A/B, Camera B/C, or Camera C/D:

Select Alignment

Turn the Vertical Alignment Screw on Camera A

Clockwise (CW):	Left Side on screen moves up.
Counter-Clockwise (CCW):	Left Side on screen moves down.

Turn the Vertical Alignment Screw on Camera C

Clockwise (CW):	Right Side on screen moves up.
Counter-Clockwise (CCW):	Right Side on screen moves down.

After Camera C has been aligned, adjust the Vertical Alignment Screw of Camera D:

Clockwise (CW):	Right Side on screen moves up.
Counter-Clockwise (CCW):	Right Side on screen moves down.

By consecutive adjustment and scanning make the horizontal line continuous.

Stitching Adjustment

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

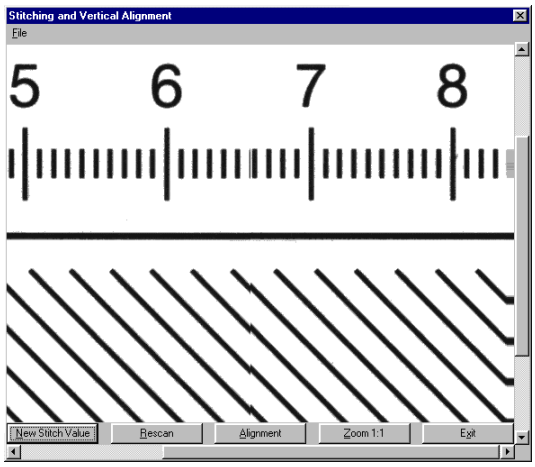
Select Stitching Area to start scanning

If the lines of the hatch-pattern are discontinuous at the transition Camera A/B, Camera B/C, or Camera C/D and the sub-divisions of the ruler are not equal, adjust the Stitch Value:

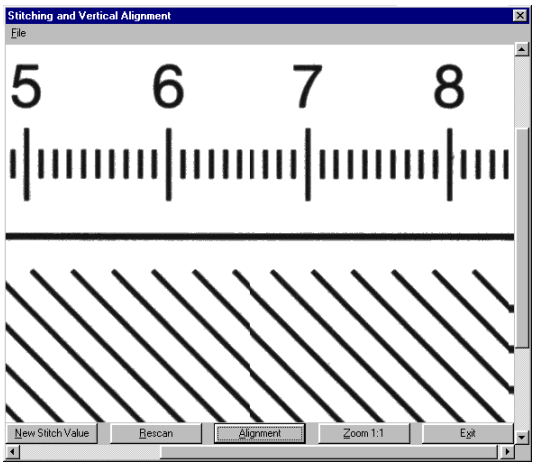
- A larger Stitch Value decreases the size of the ruler sub-division
- A smaller Stitch Value increases the size of the ruler sub-division

By consecutive adjustment and scanning make the lines of the hatch-pattern continuous and ruler sub-division equal.

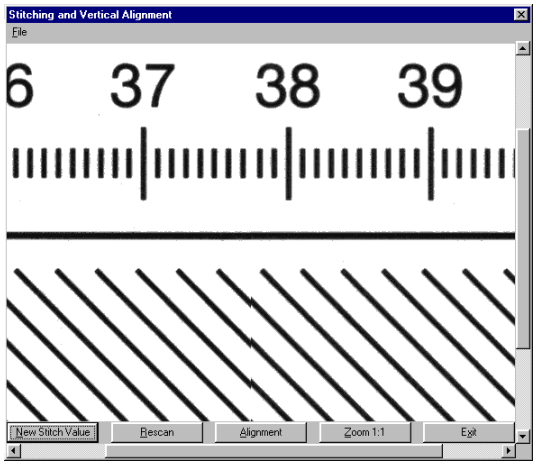
See Fig. 5-5, page 104.



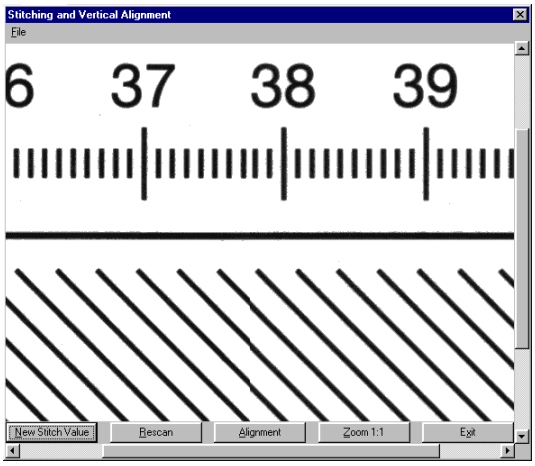
Camera A/B, Overlap
Correct by Increasing Stitching Value



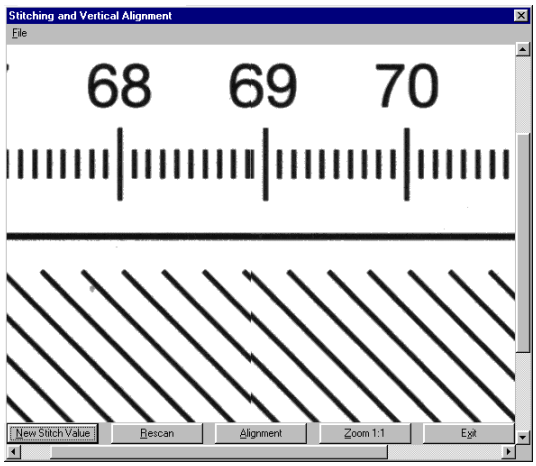
Camera A/B, Gap
Correct by Decreasing Stitching Value



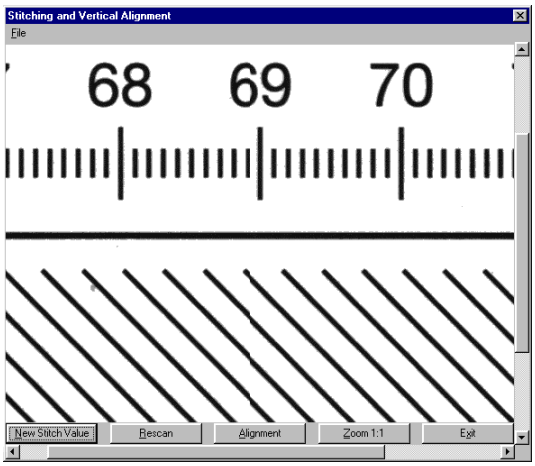
Camera B/C, Overlap
Correct by Increasing Stitching Value



Camera B/C, Gap
Correct by Decreasing Stitching Value



Camera C/D, Overlap
Correct by Increasing Stitching Value



Camera C/D, Gap
Correct by Decreasing Stitching Value

Fig. 5-5 FSS 8050 MAGNUM Stitching Images

5.3.3 FSS 225x PANORAMA and CRYSTAL 40

The above models has three CCD-Cameras, referred to from right to left as Camera A, Camera B, and Camera C. The Vertical Position of Camera B is set internally, whereas the Vertical Position of the two other cameras can be adjusted through holes behind the Model Streamer.

The cameras must be aligned vertically before the Stitching is adjusted.

Vertical Position Alignment of Camera A, and C

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

Select Stitching Area to start scanning

If the horizontal line between the ruler and the hatch-pattern is discontinuous at the transition Camera A/B or Camera B/C:

Select Alignment

Turn the Vertical Alignment Screw on Camera A

Clockwise (CW):	Left Side on screen moves down.
Counter-Clockwise (CCW):	Left Side on screen moves up.

Turn the Vertical Alignment Screw on Camera C

Clockwise (CW):	Right Side on screen moves down.
Counter-Clockwise (CCW):	Right Side on screen moves up.

By consecutive adjustment and scanning make the horizontal line continuous.

Stitching Adjustment

Start SCANtest 4

Select Test 11

Insert Stitching Adjustment Chart

Select Stitching Area to start scanning

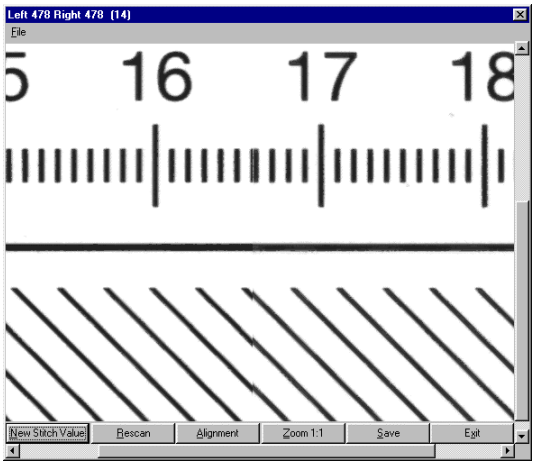
If the lines of the hatch-pattern are discontinuous at the transition Camera A/B or Camera B/C and the sub-divisions of the ruler are not equal, adjust the Stitch Value:

- A larger Stitch Value decreases the size of the ruler sub-division

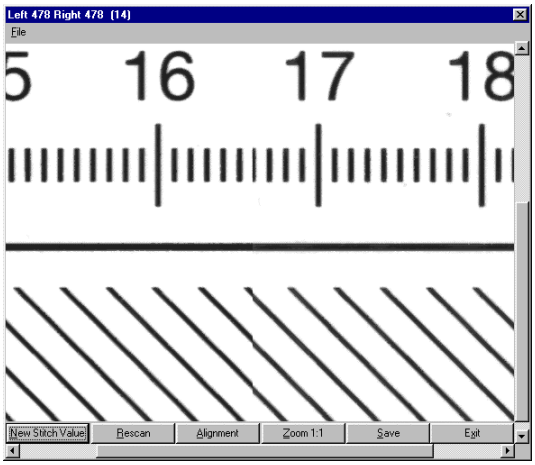
- A smaller Stitch Value increases the size of the ruler sub-division

By consecutive adjustment and scanning make the lines of the hatch-pattern continuous and ruler sub-division equal.

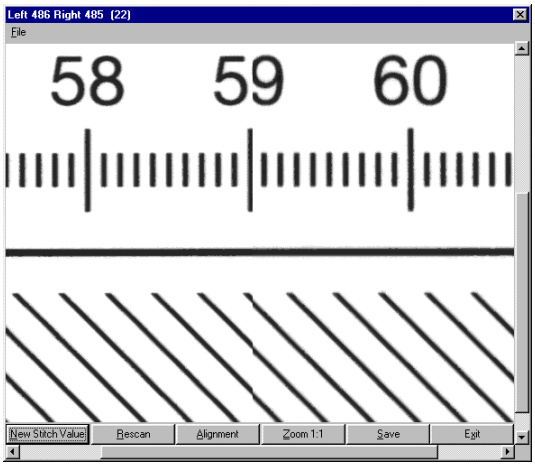
See Fig. 5-6, page 107.



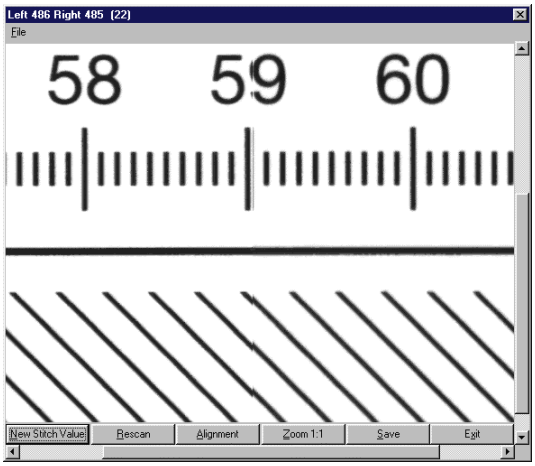
Camera A/B, Overlap
Correct by Increasing Stitching Value



Camera A/B, Gap
Correct by Decreasing Stitching Value



Camera B/C, Overlap
Correct by Increasing Stitching Value



Camera B/C, Gap
Correct by Decreasing Stitching Value

Fig. 5-6 FSS 225x PANORAMA, CRYSTAL 40, Stitching Images

6. Maintenance Check of CCD-Camera Adjustments

This chapter describes how to check the CCD-Camera Adjustments by means of screen images scanned with Test 10 of SCANtest 4.
The tolerances given here are for maintenance check only, and should not be used for adjustments.

6.1 Light Profile

Place the Original Guide Plate in the scan-area.

Start SCANtest 4

Select Test 10

Select Uncorrected or Corrected Light Profile

Select Execute

Select Green Channel (MAGNUM and CHROMA only)

Select Scan All Cameras

The following figures show screen images of the typical Light Profiles:

Fig. 6-1 FSC x040 CHROMA, Light Profiles Uncorrected (WBP), page 110
Fig. 6-2 FSC x040 CHROMA, Light Profiles Corrected (WBP), page 111
Fig. 6-3 FSC x040 CHROMA, Light Profiles Corrected (BCS), page 111
Fig. 6-4 FSC x050 MAGNUM, Light Profiles Uncorrected (WBP), page 112
Fig. 6-5 FSC x050 MAGNUM, Light Profiles Corrected (WBP), page 113
Fig. 6-6 FSC x050 MAGNUM, Light Profiles Corrected (BCS), page 113
Fig. 6-7 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Uncorrected (WBP), page 114
Fig. 6-8 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Corrected (WBP), page 115
Fig. 6-9 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Corrected (BCS), page 115

The Light Profile Correction of the scanner is based on a Light Profile of the Basic-Calibration Sheet stored in Flash Memory from the last time the scanner was Basic- or Color Calibrated.
Therefore, the Corrected Light Profile image of the Basic-Calibration Sheet (or any other media with similar surface characteristics) will show an even signal level.
The Corrected Light Profile image of media with a surface different from the Basic-Calibration Sheet will reflect these differences. For example, the Light Profiles of the White Background Plate in Fig. 6-5 show an uneven signal level and noise spikes which are caused by small dents, scratches, pin holes, or other similar imperfections of surface of the White Background Plate.

Hint
Noise spikes that are seen on the Corrected Light Profile of the Basic-Calibration Sheet are likely to cause vertical lines in the scanned image.
See also Test 20, Noise Test, page 160.

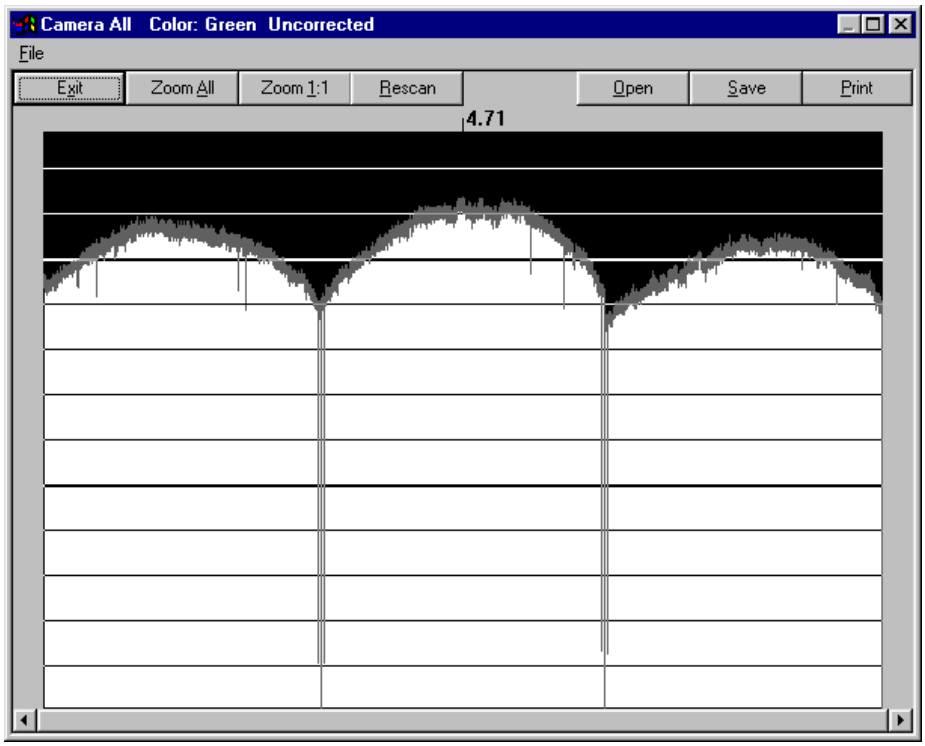


Fig. 6-1 FSC x050 CHROMA, Light Profiles Uncorrected
White Background Plate

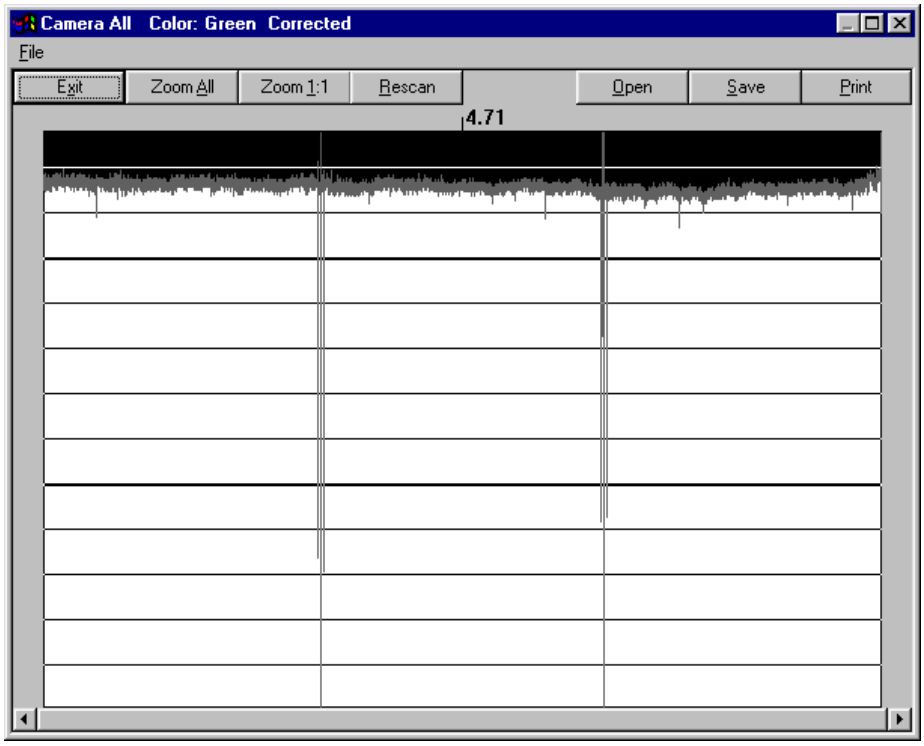


Fig. 6-2 FSC x040 CHROMA, Light Profiles Corrected
White Background Plate

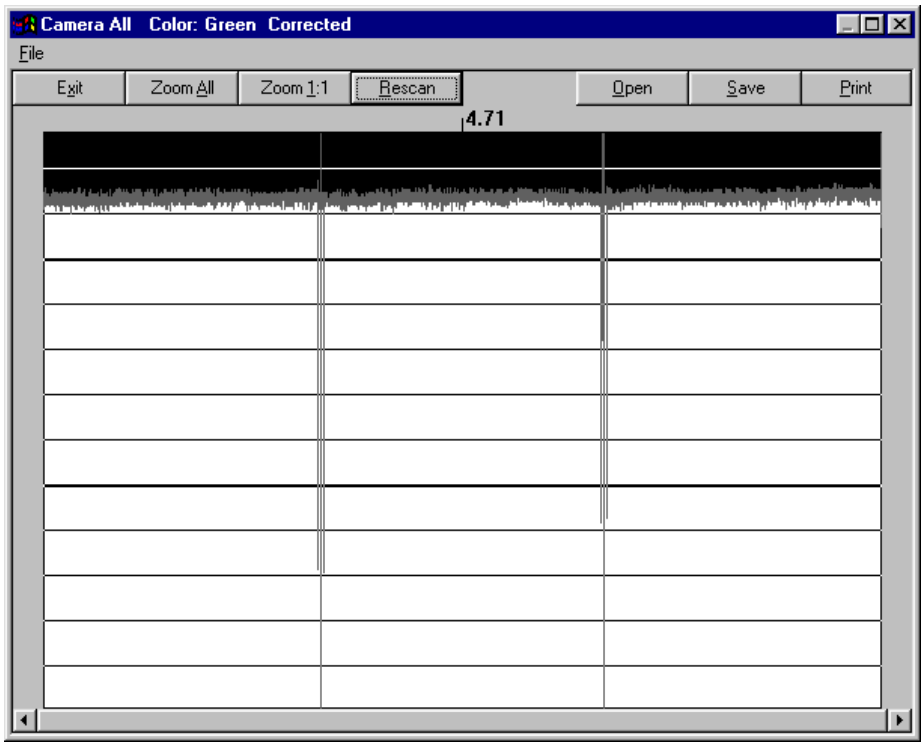


Fig. 6-3 FSC x040 CHROMA, Light Profiles Corrected
Basic Calibration Sheet

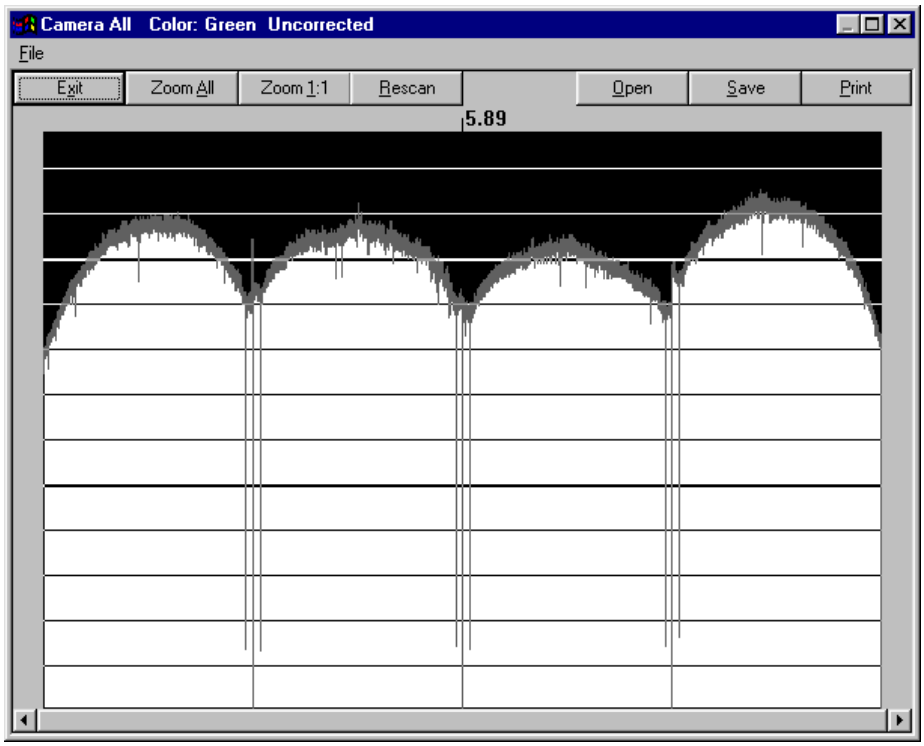


Fig. 6-4 FSC x050 MAGNUM, Light Profiles Uncorrected
White Background Plate

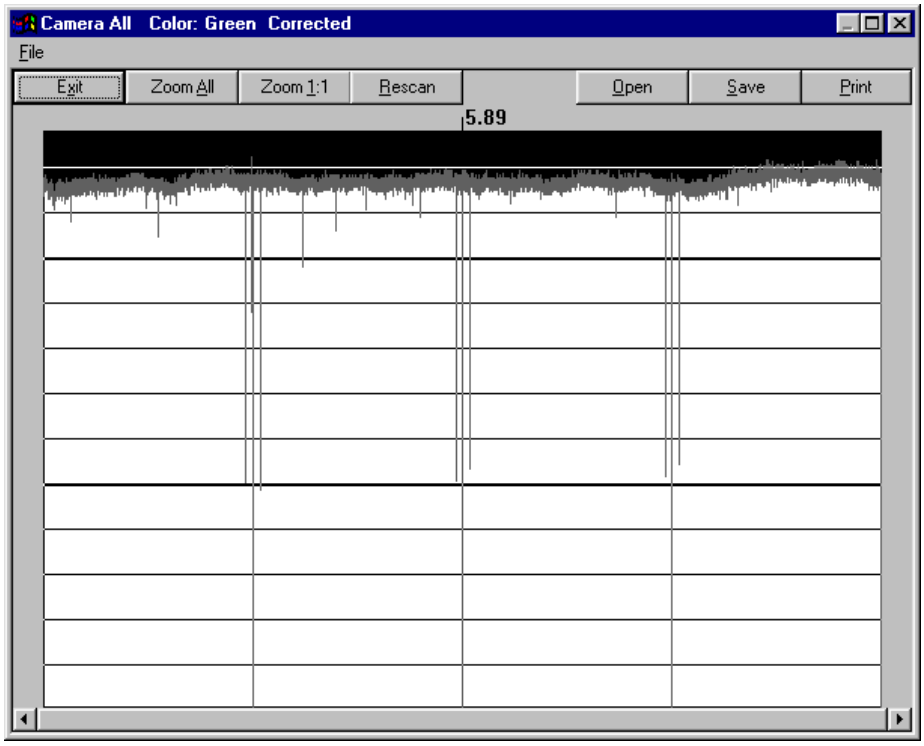


Fig. 6-5 FSC x050 MAGNUM, Light Profiles Corrected
White Background Plate

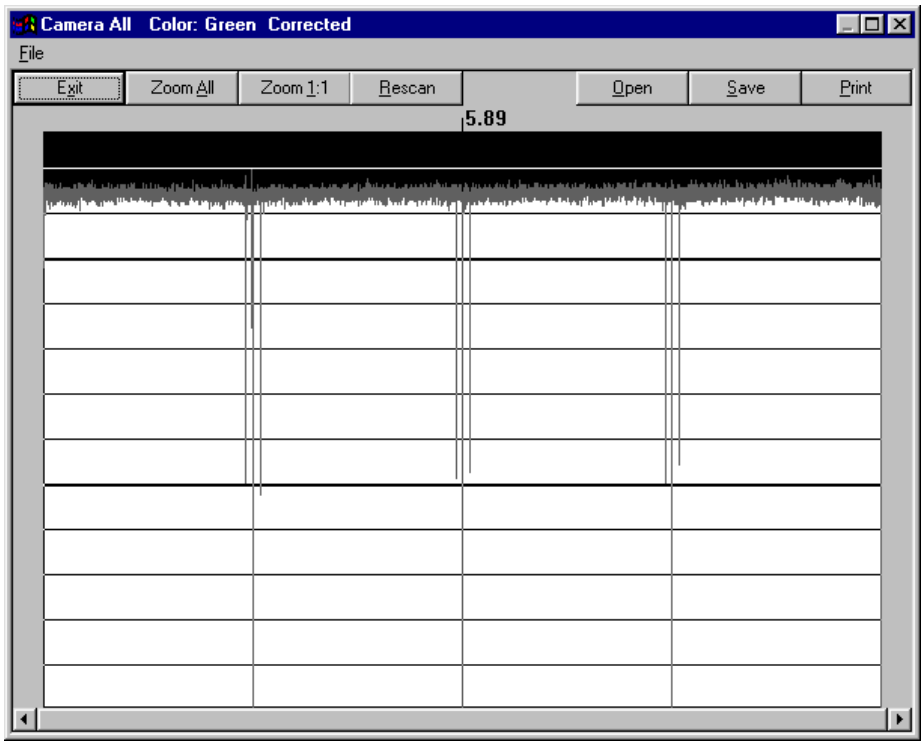


Fig. 6-6 FSC x050 MAGNUM, Light Profiles Corrected
Basic Calibration Sheet

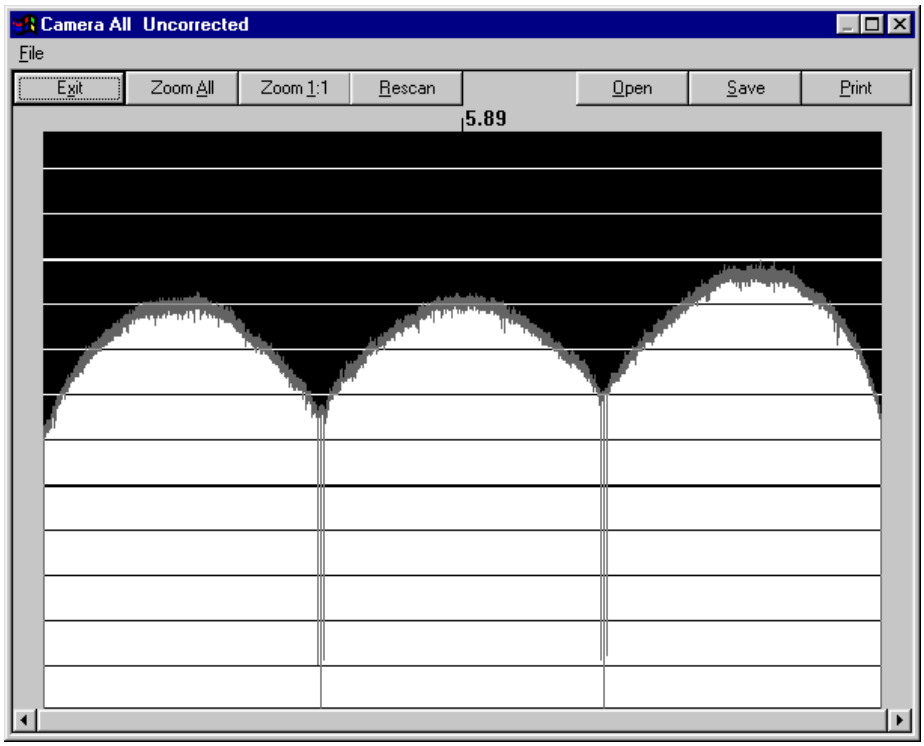


Fig. 6-7 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Uncorrected White Background Plate

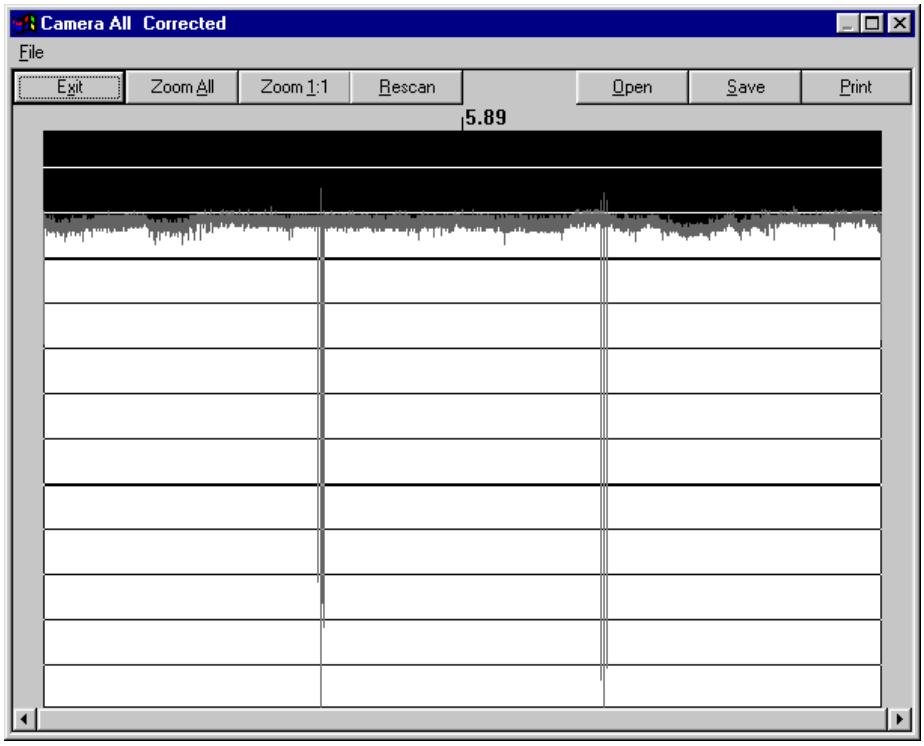


Fig. 6-8 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Corrected White Background Plate

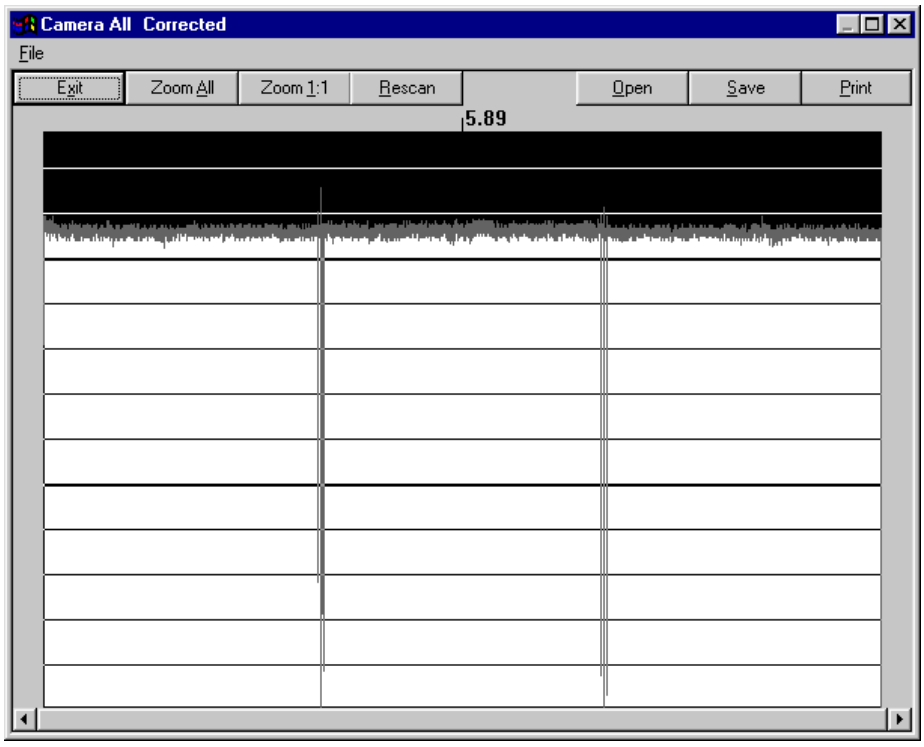


Fig. 6-9 FSS 225x PANORAMA, CRYSTAL 40, Light Profiles Corrected Basic Calibration Sheet

6.2 Focus

The check of the Focus Adjustment is based on a Test 10 scan made with the Focus Pattern placed in the scan-area.
The Focus Pattern, 6799A219, is shown in Fig. 4-23, page 93.

Start	SCANtest 4
Select	Test 10
Select	Corrected Light Profile
Select	Execute
Select	Blue Channel (MAGNUM and CHROMA only)
Insert	Focus Pattern *)
Select	Scan All Cameras

*) FSC x050 MAGNUM, FSC 0x40 CHROMA:
Insert the Focus Pattern and feed it by using the Forward Key until it flushes with the rear edge of the Top Profile (Lid) The image of the pattern with 5 lp/mm should now be in the scan area, see Fig. 4-23, page 93.

*) FSS 225x PANORAMA, CRYSTAL 40:
Insert the Focus Pattern and feed it by using the Forward Key until it is centered under the Top Profile (Lid)) The image of the pattern with 3.3 lp/mm should now be in the scan area, see Fig. 4-23, page 93.

This test does not show whether the Focus Adjustment is optimal or whether it could be improved. But the adjustment is acceptable if the amplitude of the Focus Signal is approximately 4 divisions peak-to-peak (MAGNUM and CHROMA) or 5 divisions peak-to-peak (PANORAMA, CRYSTAL). The amplitude of the Focus signal (Corrected) should be even within:

Min/Max > 0.7 for each separate camera.
Min/Max > 0.8 at the transition between adjacent cameras.

The following figures shows screen images of the Focus Signal:

Fig. 6-10 FSC x040 CHROMA, Focus Signals Uncorrected, page 117
Fig. 6-11 FSC x040 CHROMA, Focus Signals Corrected, page 117
Fig. 6-12 FSC x050 MAGNUM, Focus Signals Uncorrected, page 118
Fig. 6-13 FSC x050 MAGNUM, Focus Signals Corrected, page 118
Fig. 6-14 FSS 225x PANORAMA, CRYSTAL 40, Focus Signals Uncorrected, page 119
Fig. 6-15 FSS 225x PANORAMA, CRYSTAL 40, Focus Signals Corrected, page 119

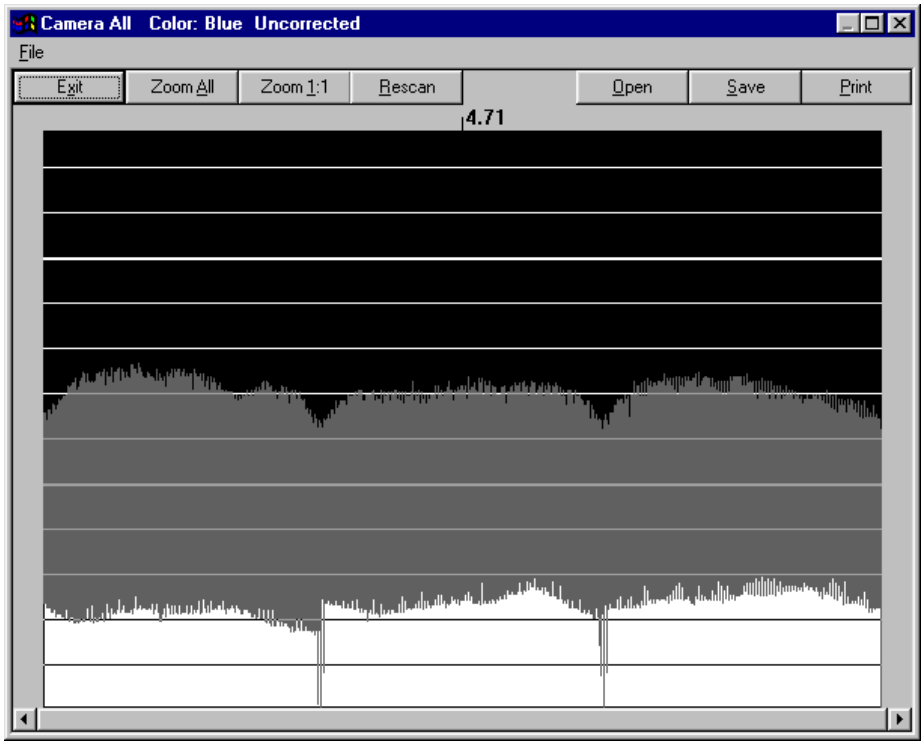


Fig. 6-10 FSC x040 CHROMA, Focus Signal Uncorrected

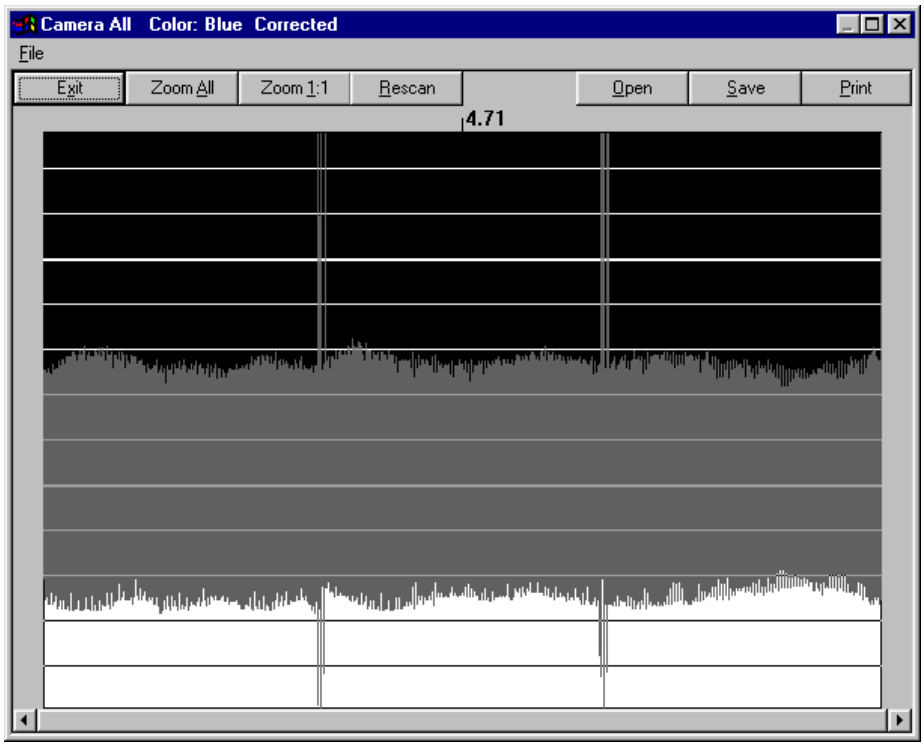


Fig. 6-11 FSC x040 CHROMA, Focus Signal Corrected

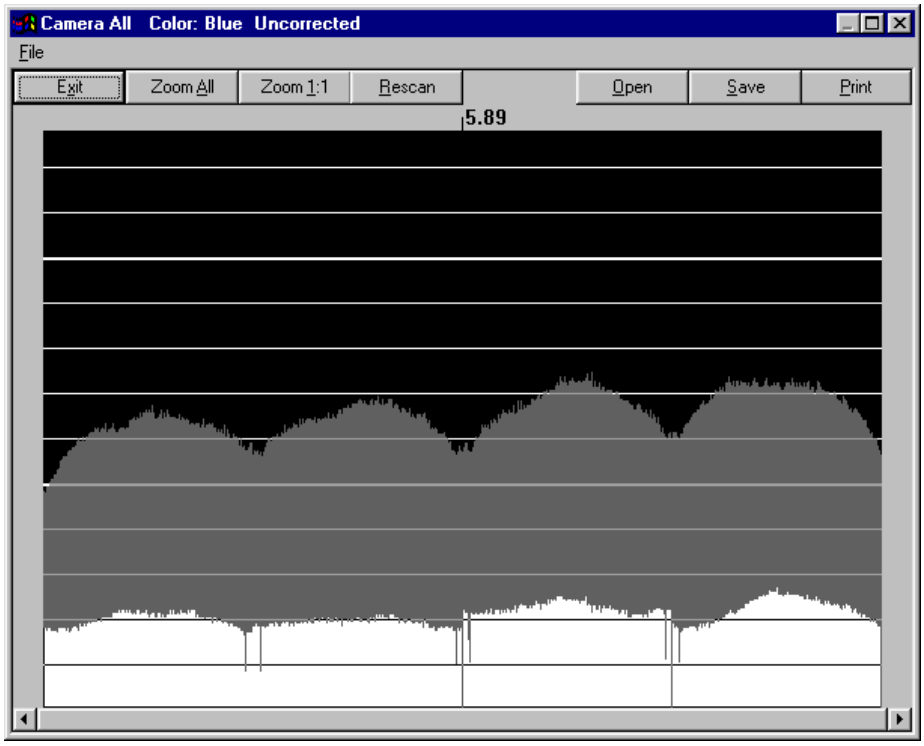


Fig. 6-12 FSC x050 MAGNUM, Focus Signal Uncorrected

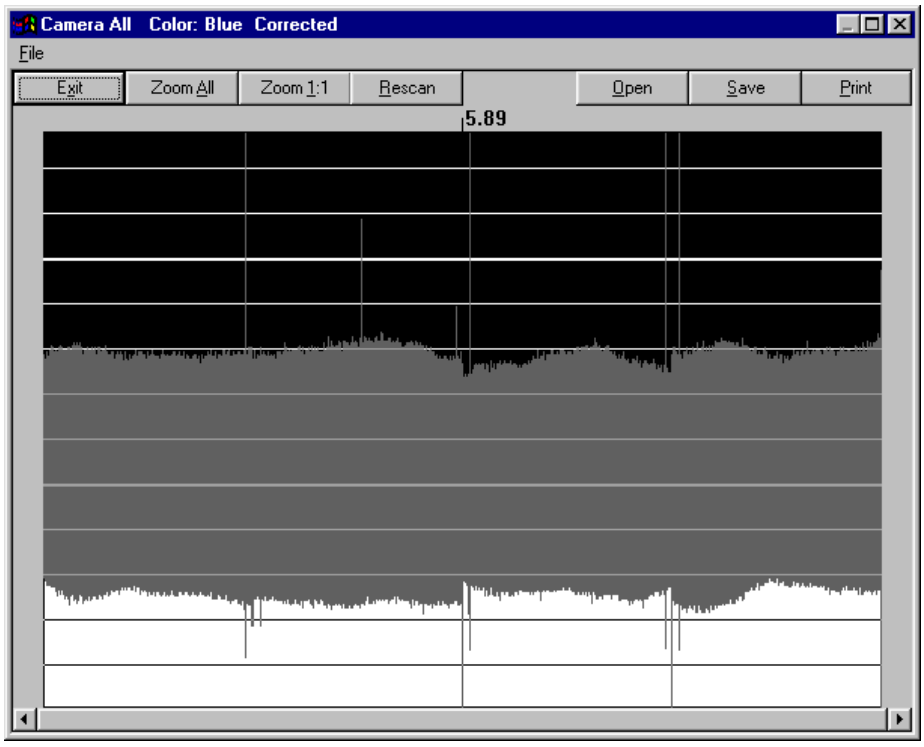


Fig. 6-13 C x050 MAGNUM, Focus Signal Corrected

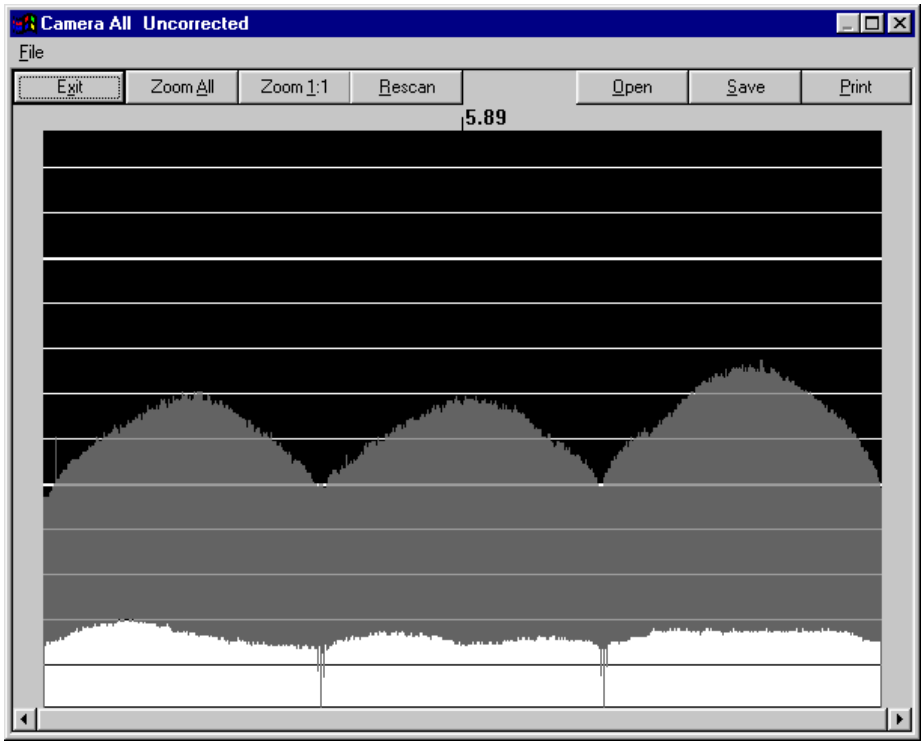


Fig. 6-14 FSS 225x PANORAMA, CRYSTAL 40, Focus Signals Uncorrected

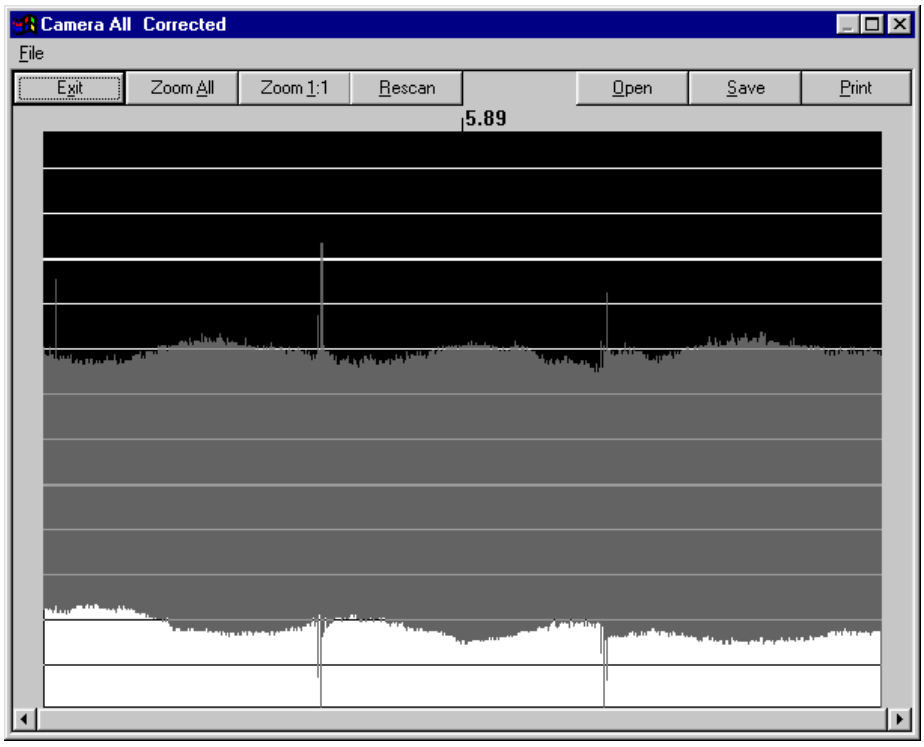


Fig. 6-15 FSS 225x PANORAMA, CRYSTAL 40, Focus Signals Corrected

6.3 Scan-Width, CCD-Centering and Vertical Positioning

The check of Scan-Width, CCD-Centering, and Vertical Positioning is based on a Test 10 scan made with the Optical Adjustment Pattern placed in the scan-area.
The Optical Adjustment Patterns and a description of the sub-patterns are shown in Fig. 4-22, page 92.

Place the Optical Adjustment Pattern:

Model	Optical Adjustment Pattern
FSC x040 CHROMA	6799A130
FSC x050 MAGNUM	6799A103
FSS 225x PANORAMA	6799A135
CRYSTAL 40	6799A135

in the scan-area.

In order to ensure correct positioning, the Optical Adjustment Pattern should be pushed towards the Operator Panel side and towards the rear of the scanner.

Start SCANtest 4

Select Test 10

Select Uncorrected Light Profile

Select Execute

Select Green Channel (MAGNUM and CHROMA only)

Select Scan the actual Camera

The scanning should be made on the individual camera to give the most detailed image of the adjustment.

Check the screen image by comparing with the images listed below. If necessary, readjust as described in Section 4.2, page 64.

Fig. 6-16 FSC x040 CHROMA, Camera A, Scanline Start, page123
Fig. 6-17 FSC x040 CHROMA, Camera A, Scanline End, page123
Fig. 6-18 FSC x040 CHROMA, Camera B, Scanline Start, page124
Fig. 6-19 FSC x040 CHROMA, Camera B, Scanline End, page124
Fig. 6-20 FSC x040 CHROMA, Camera C, Scanline Start, page125
Fig. 6-21 FSC x040 CHROMA, Camera C, Scanline End, page125

Fig. 6-22 FSC x050 MAGNUM, Camera A, Scanline Start, page 126
Fig. 6-23 FSC x050 MAGNUM, Camera A, Scanline End, page 126
Fig. 6-24 FSC x050 MAGNUM, Camera B, Scanline Start, page 127
Fig. 6-25 FSC x050 MAGNUM, Camera B, Scanline End, page 127

Fig. 6-26 FSC x050 MAGNUM, Camera C, Scanline Start, page 128
Fig. 6-27 FSC x050 MAGNUM, Camera C, Scanline End, page 128
Fig. 6-28 FSC x050 MAGNUM, Camera D, Scanline Start, page 129
Fig. 6-29 FSC x050 MAGNUM, Camera D, Scanline End, page 129
Fig. 6-30 FSS 225x PANORAMA, CRYSTAL 40, Camera A, Scanline Start, page 130
Fig. 6-31 FSS 225x PANORAMA, CRYSTAL 40, Camera A, Scanline End, page 130
Fig. 6-32 FSS 225x PANORAMA, CRYSTAL 40, Camera B, Scanline Start, page 131
Fig. 6-33 FSS 225x PANORAMA, CRYSTAL 40, Camera B, Scanline End, page 131
Fig. 6-34 FSS 225x PANORAMA, CRYSTAL 40, Camera C, Scanline Start, page 132
Fig. 6-35 FSS 225x PANORAMA, CRYSTAL 40, Camera C, Scanline End, page 132

Scan-Width

The Scan-Width is correct if the total sum of Scan-Width Units (SWU) at the start and the end of the scanline is as shown in the table below (*1 SWU is either 1 Black Line or 1 White Space of Scan-Width Pattern*).

Model	**Optical Adjustment Pattern**	**Total sum of Scan-Width Units**	**Tolerance**
FSC x040 CHROMA	6799A130, sub-pattern A	6	±0.5 SWU
FSC x050 MAGNUM	6799A103, sub-pattern A	6	±0.5 SWU
FSS 225x PANORAMA	6799A135, sub-pattern A	6	±0.5 SWU
CRYSTAL 40	6799A135, sub-pattern A	6	±0.5 SWU

The tolerance corresponds to approximately 0.10% error on the Scan-Width.

CCD-Centering

The Black Lines and White Spaces of the Scan-Width Pattern should be distributed symmetrically with the following number of Scan-Width Units at both ends of the scanline:

Model	**Optical Adjustment Pattern**	**No of Scan-Width Units, start**	**No of Scan-Width Units, end**	**Tolerance**
FSC x040 CHROMA	6799A130, sub-pattern A	3	3	± 1 SWU
FSC x050 MAGNUM	6799A103, sub-pattern A	3	3	± 1 SWU
FSS 225x PANORAMA	6799A135, sub-pattern A	3	3	± 1 SWU
CRYSTAL 40	6799A135, sub-pattern A	3	3	± 1 SWU

The tolerance on the CCD-Centering means that a sidewise shift of the CCD corresponding to ± 1 SWU is acceptable.

Vertical Positioning

A check of the Vertical Position of the CCD-Cameras is based on the number of black lines of the Vertical Position Pattern that crosses the scanline (the Vertical Position Pattern is sub-pattern B of Fig. 4-22, page 92). The step height of the Black Lines in the Vertical Position Pattern is shown in the table following:

Model	Optical Adjustment Pattern	Step Height of Black Lines	Step Height 0 through 16 Black Lines
FSC x040 CHROMA	6799A130, sub-pattern B	0.15 mm	2.25 mm
FSC x050 MAGNUM	6799A103, sub-pattern B	0.15 mm	2.25 mm
FSS 225x PANORAMA	6799A135, sub-pattern B	0.15 mm	2.25 mm
CRYSTAL 40	6799A135, sub-pattern B	0.15 mm	2.25 mm

The cameras are adjusted to 8 Black Lines of Vertical Position Pattern at both ends of the scanlines, and the adjustment is acceptable if the number of Black Lines of the Green channel (MAGNUM and CHROMA only) is within:

max. 12 Black Lines
min. 4 Black Lines

The sloping of a scanline, i.e. the difference in the number of Black Lines at the **start** and at the **end** of the scanline must be less than:

2 Black Lines

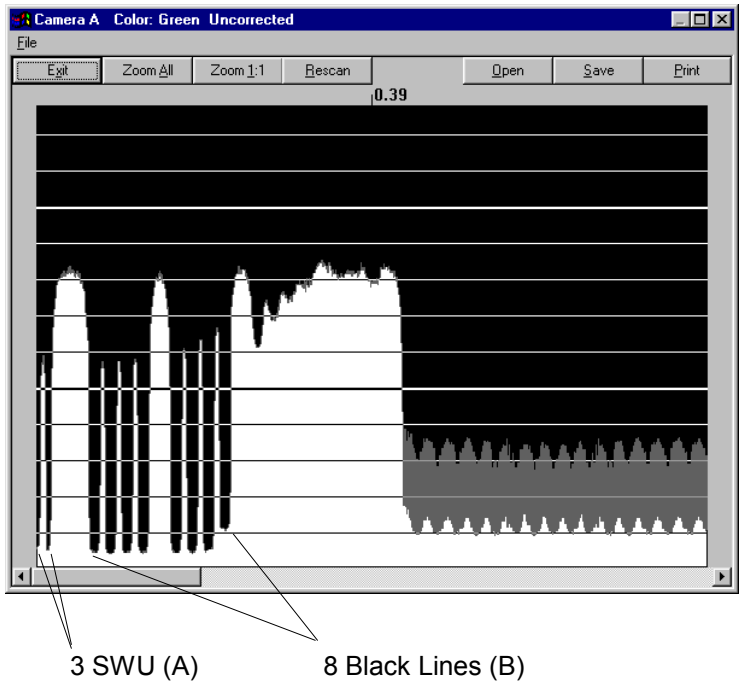


Fig. 6-16 FSC x040 CHROMA, Camera A, Scanline Start

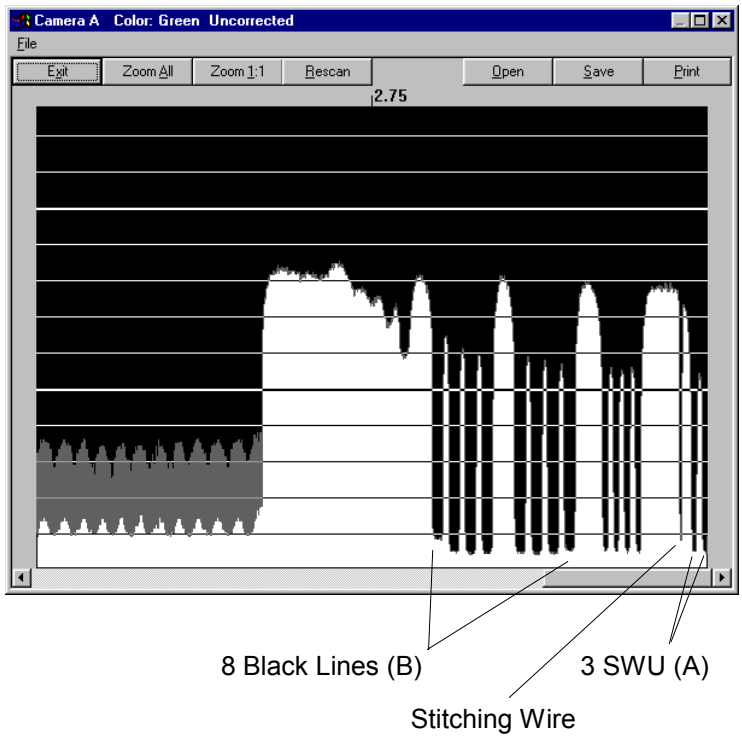


Fig. 6-17 FSC x040 CHROMA, Camera A, Scanline End

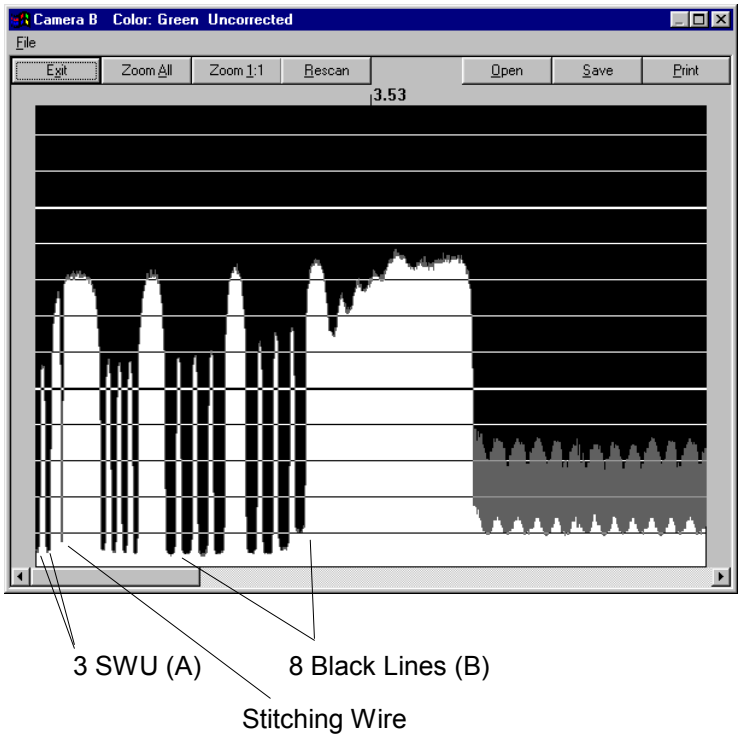


Fig. 6-18 FSC x040 CHROMA, Camera B, Scanline Start

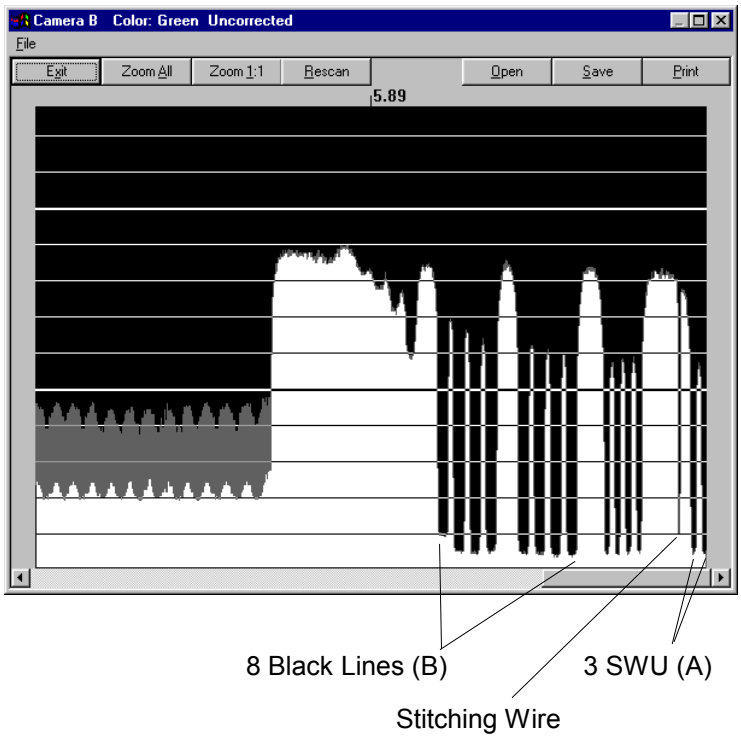


Fig. 6-19 FSC x040 CHROMA, Camera B, Scanline End

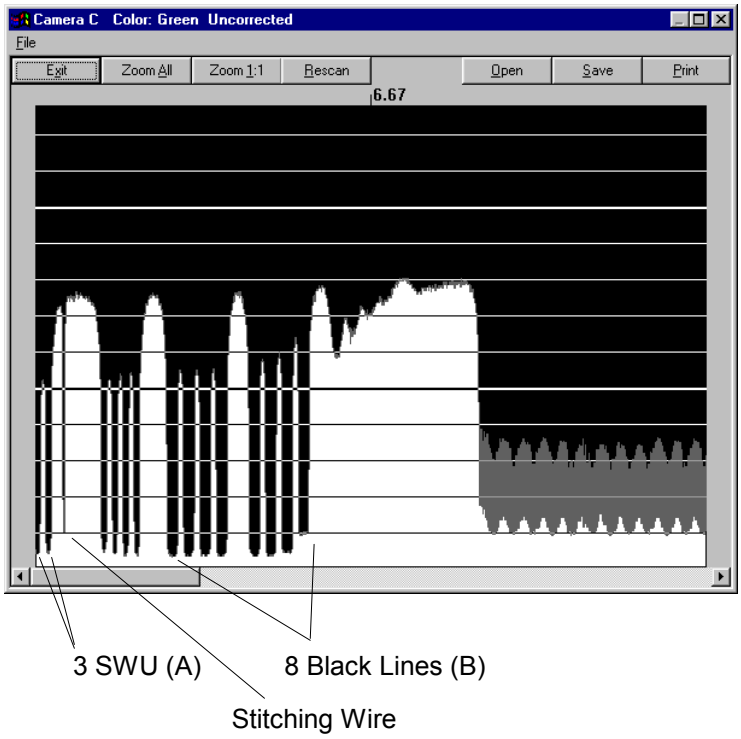


Fig. 6-20 FSC x040 CHROMA, Camera C, Scanline Start

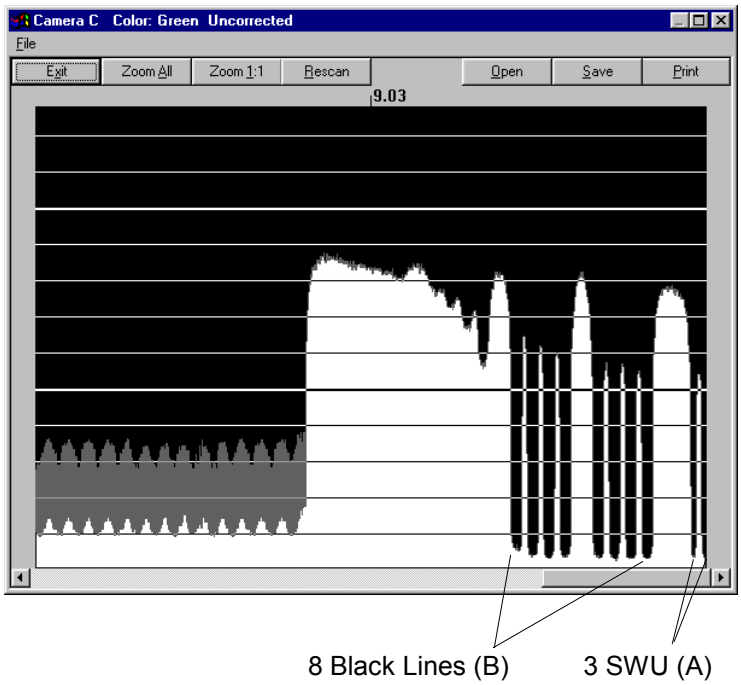


Fig. 6-21 FSC x040 CHROMA, Camera C, Scanline End

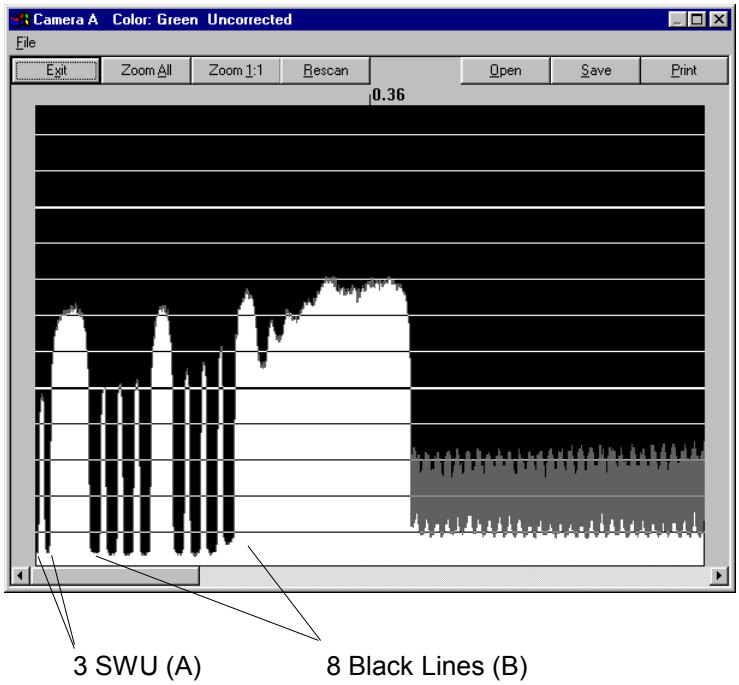


Fig. 6-22 FSC x050 MAGNUM, Camera A, Scanline Start

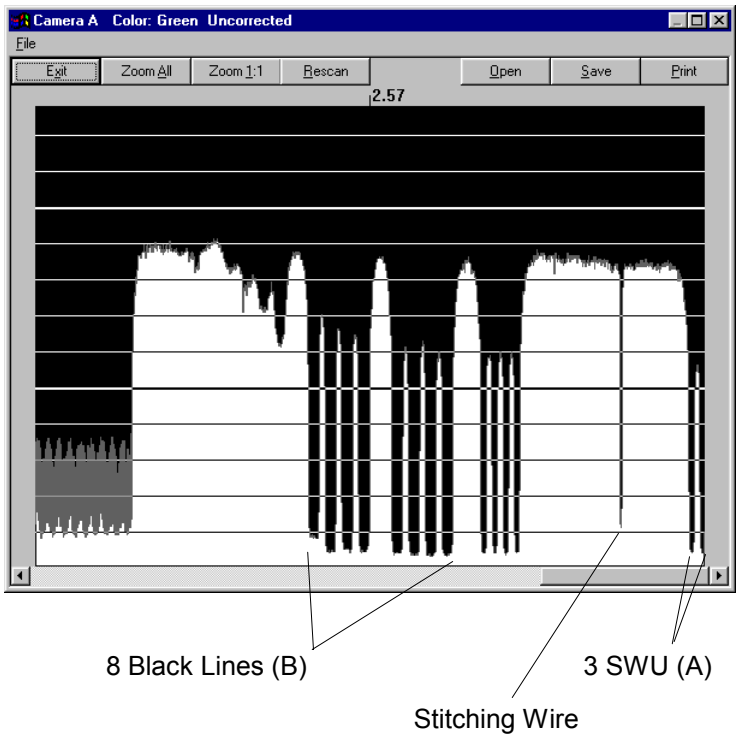


Fig. 6-23 FSC x050 MAGNUM, Camera A, Scanline End

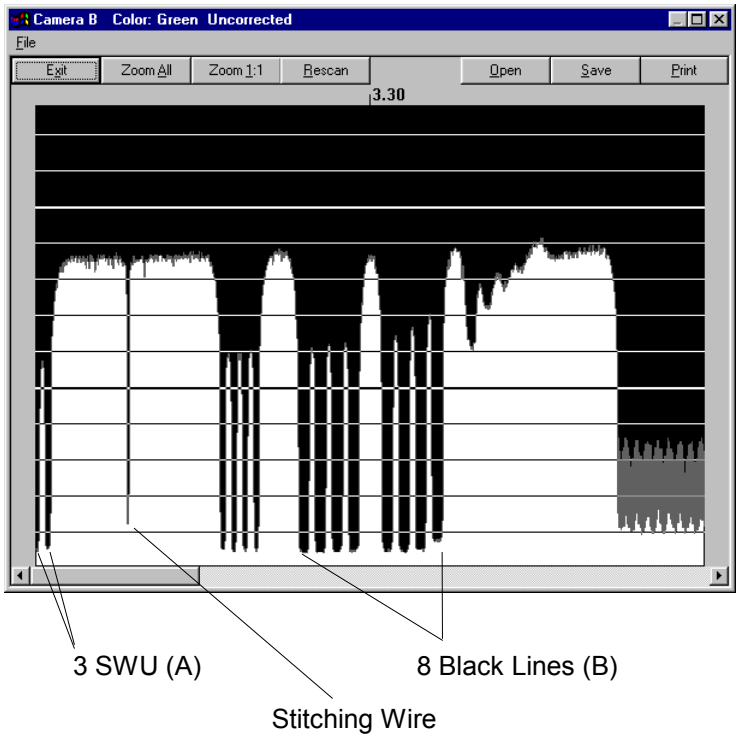


Fig. 6-24 FSC x050 MAGNUM, Camera B, Scanline Start

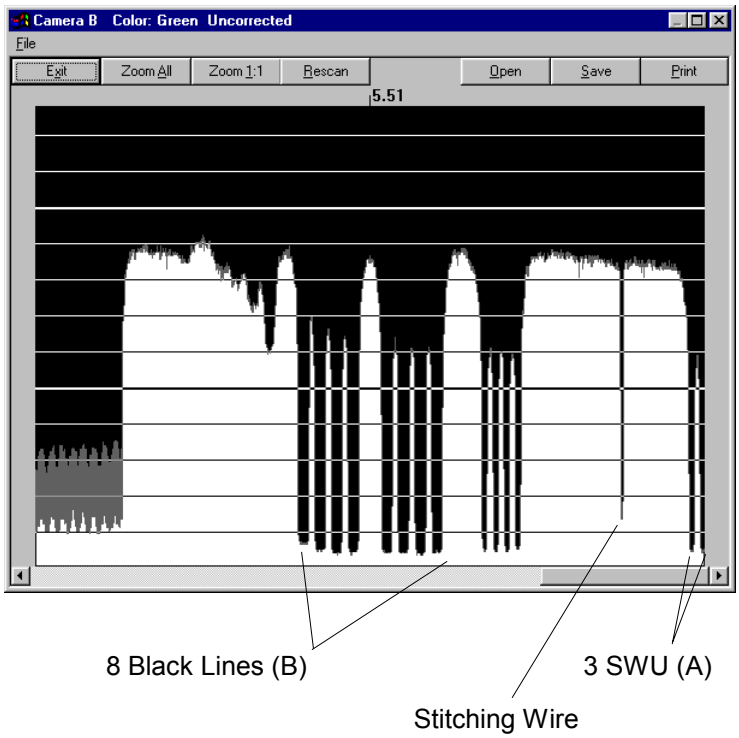


Fig. 6-25 FSC x050 MAGNUM, Camera B, Scanline End

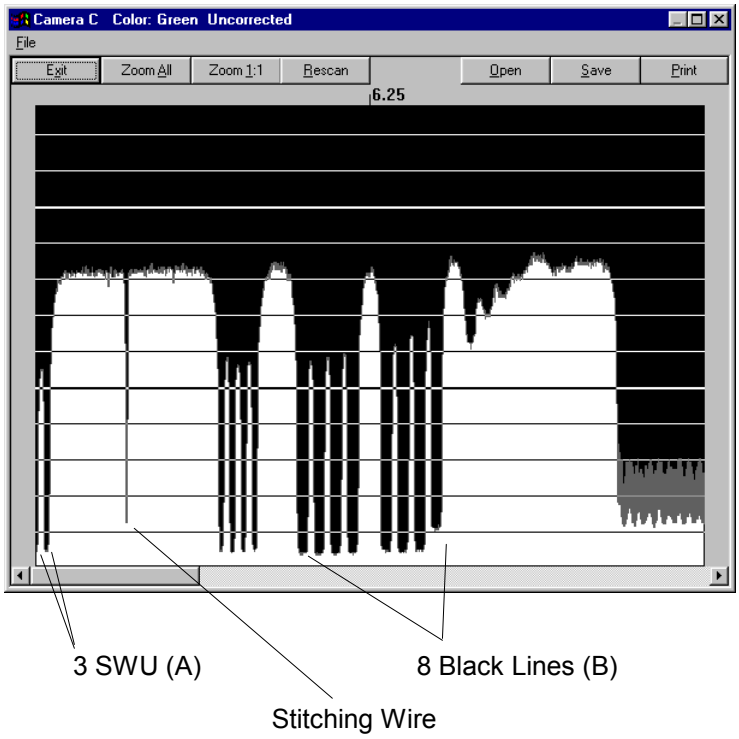


Fig. 6-26 FSC x050 MAGNUM, Camera C, Scanline Start

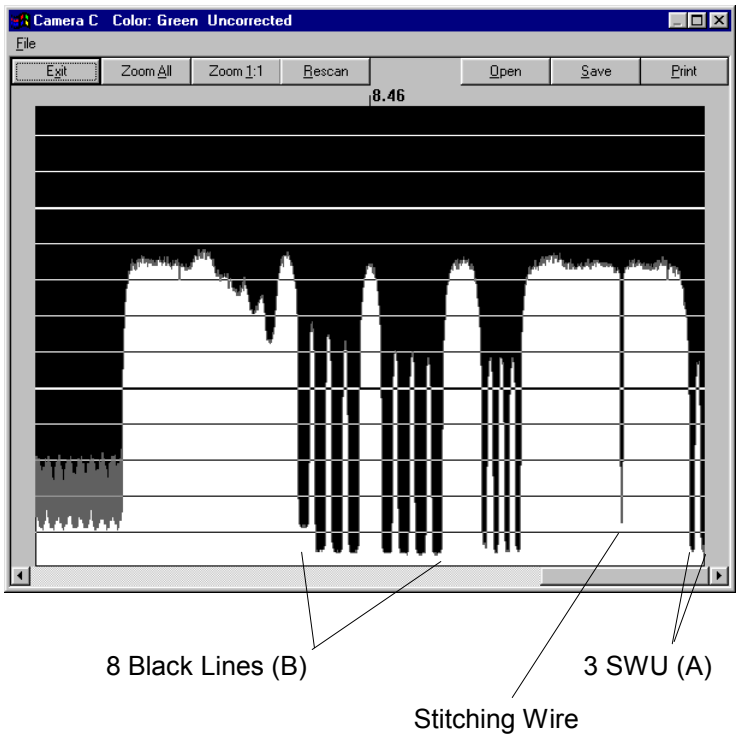


Fig. 6-27 FSC x050 MAGNUM, Camera C, Scanline End

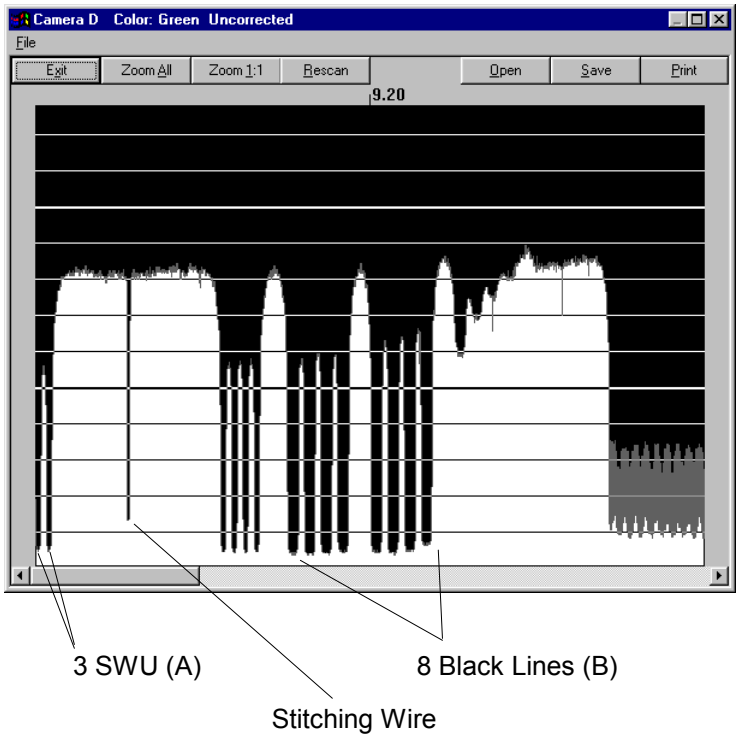


Fig. 6-28 FSC x050 MAGNUM, Camera D, Scanline Start

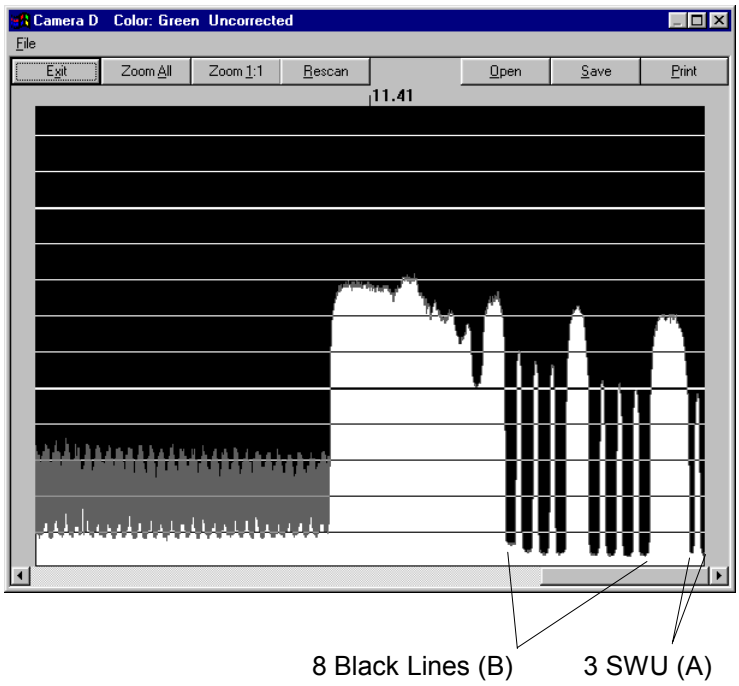


Fig. 6-29 FSC x050 MAGNUM, Camera D, Scanline End

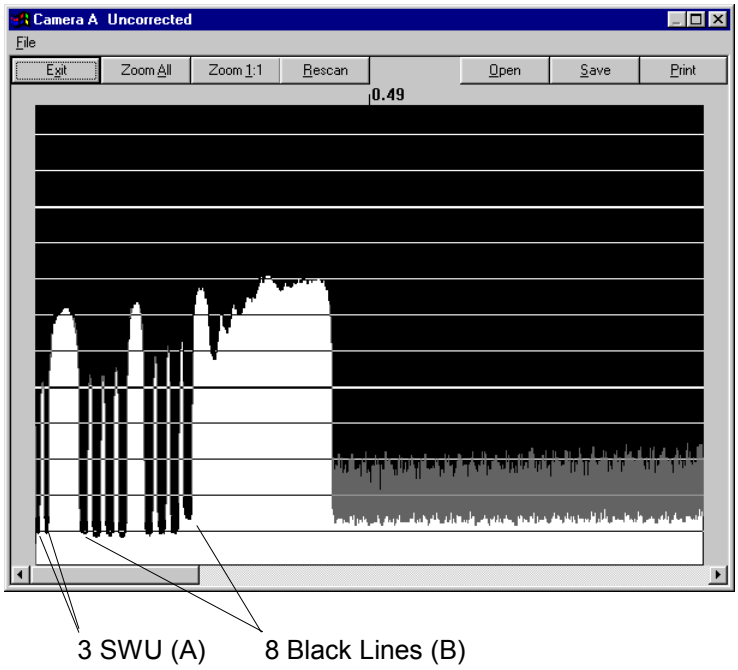


Fig. 6-30 FSS 225x PANORAMA, CRYSTAL 40, Camera A, Scanline Start

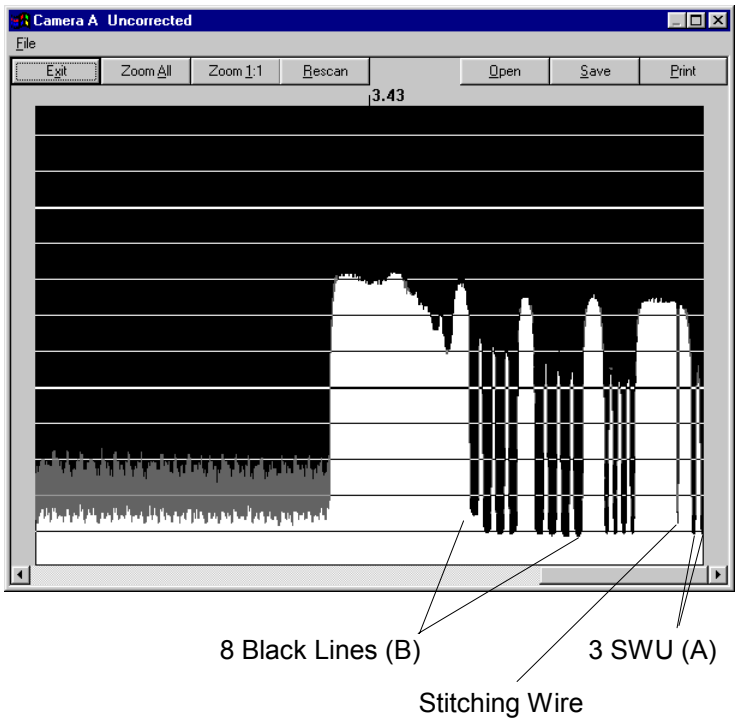


Fig. 6-31 FSS 225x PANORAMA, CRYSTAL 40, Camera A, Scanline End

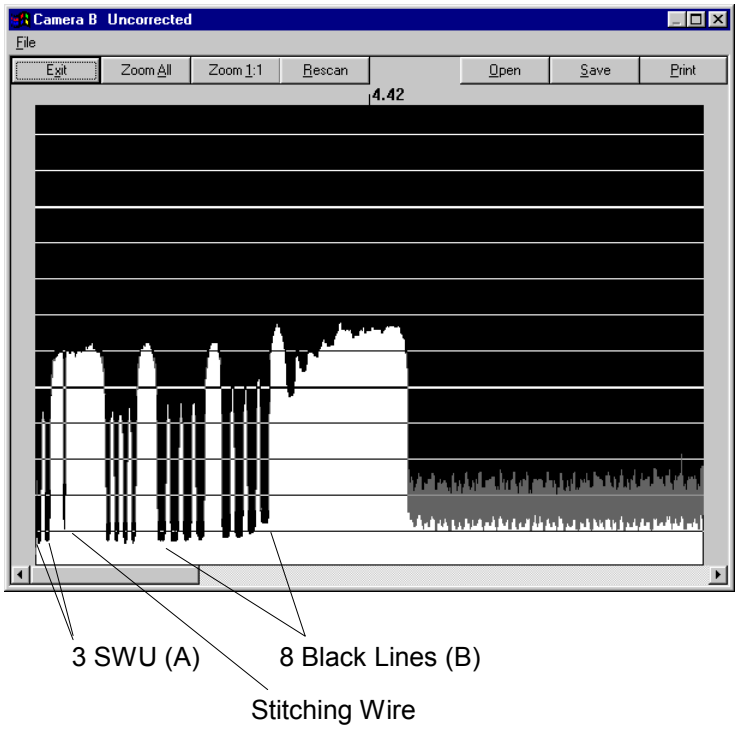


Fig. 6-32 FSS 225x PANORAMA, CRYSTAL 40, Camera B, Scanline Start

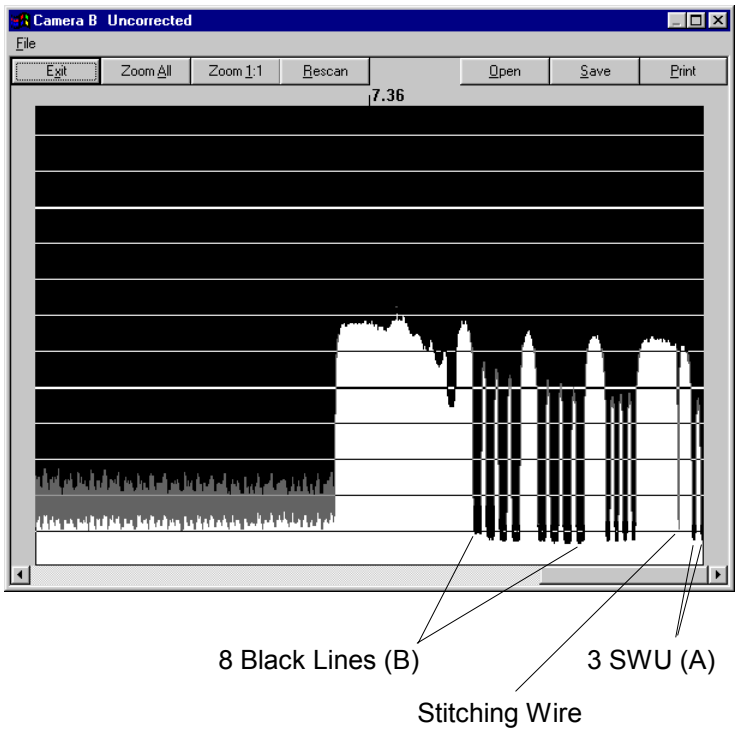


Fig. 6-33 FSS 225x PANORAMA, CRYSTAL 40, Camera B, Scanline End

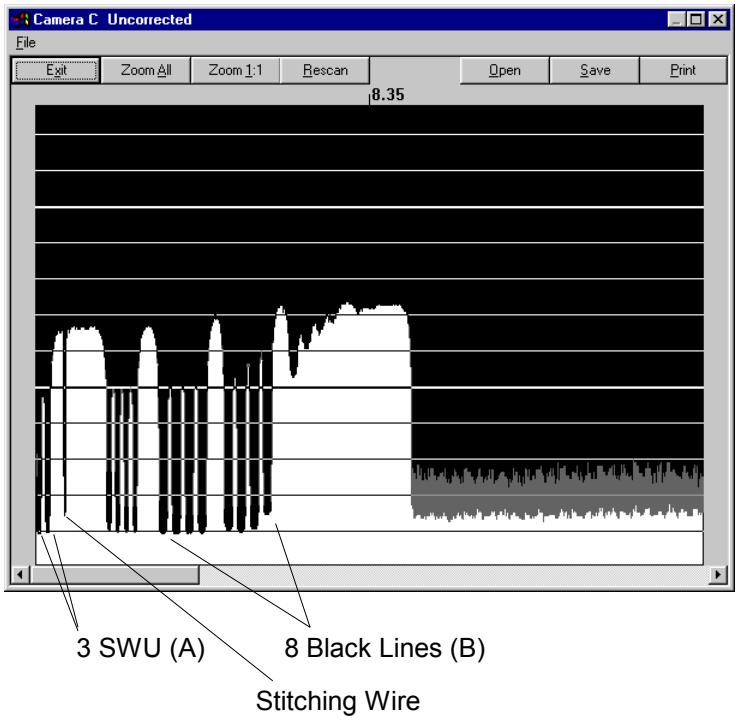


Fig. 6-34 FSS 225x PANORAMA, CRYSTAL 40, Camera C, Scanline Start

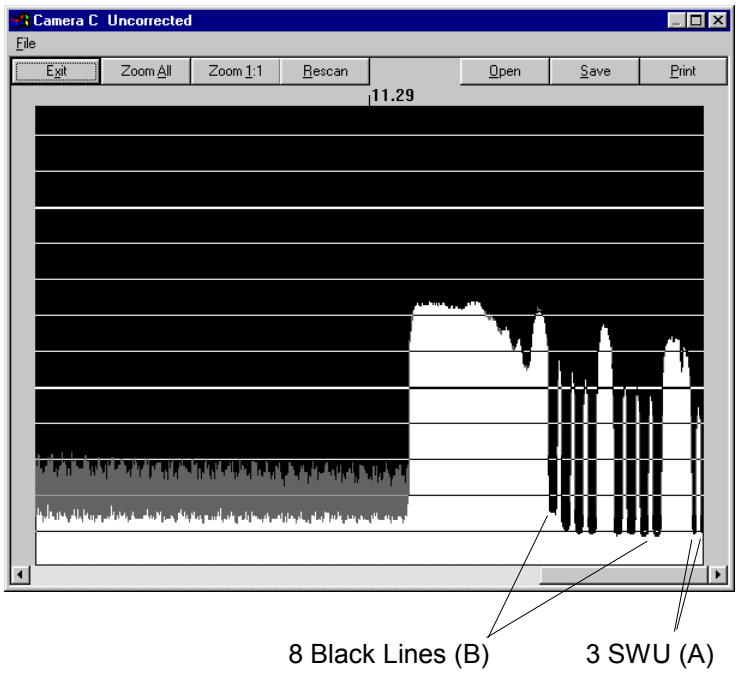


Fig. 6-35 FSS 225x PANORAMA, CRYSTAL 40, Camera C, Scanline End

7. General Maintenance

General Maintenance consists of the following steps:

- Cleaning of the scanning area.
- Checking if the Fluorescent Lamps have darkened at the ends.
- Checking Lamp Driver Adjustments.
- Checking Camera Adjustments.
- Checking Stitching and Vertical Alignment.
- Running WIDEimage, Calibrate Scanner.

For special service tools for General Maintenance, please refer to Chapter 13, page 170.

7.1 Step by Step Procedure for General Maintenance

7.1.1 Remove Top Cover

Disassembly and Assembly, see Chapter 9, page 145.

7.1.2 Cleaning of the Scanning Area

The following parts are cleaned using a soft lint-free cloth wetted with a mild cleaning detergent.
Alternatively, the parts may be cleaned without the use of cleaning detergents by using a damp microfibre cleaning cloth (wet the cloth with water and wring until damp).

- The White Background Plate on the Original Guide Plate.
- Both sides of the Glass Plate.
  Be careful not to push the Stitching Wires (located under the Glass Plate) out of position.
  Do not use alcohol or other solvents, as this may dissolve the paint used for the black masks on the backside of the glass plate.
- The Mirrors.
  It is necessary to remove the Mirror Chassis, see Section 9.9, page 147, to get access to the mirrors for cleaning. The Camera Adjustment must be checked and if necessary readjusted after replacement of the Mirror Chassis.
- The Feed Rollers.
  May be cleaned with a damp microfibre cleaning cloth.

7.1.3 Fluorescent Lamps

Check the fluorescent lamps for signs of wear, such as darkened ends or discolored (black stained) tube.
If there are signs of wear, the lamp should be replaced, see Section 10.4, page 150.

7.1.4 Check Lamp Driver Adjustment

Procedure, see Section 3.4.2, page 38.
Check and if necessary readjust the Lamp Driver.

7.1.5 Check CCD-Camera Adjustment

Procedure, see Chapter 6, page 108.
Make a note if readjustments are required.

7.1.6 Readjustment of CCD-Cameras

If the Maintenance Check described in Chapter 6 indicated the need for readjustments, readjust using the procedures in Section 4.2, page 64.

7.1.7 Mount Top Cover

Disassembly and Assembly, see Chapter 9, page 145.

7.1.8 Check Stitching and Vertical Alignment

Procedure, see Chapter 5, page 94.
The Vertical Alignment of the CCD-Cameras must be correct before the Stitching can be checked.

7.1.9 Calibrate Scanner

When running WIDEimage, Calibrate Scanner, the scanner is first Basic Calibrated using the Basic-Calibration Sheet and, next, if it is a MAGNUM or CHROMA, Color Calibrated using the IT8-Color Calibration Sheet:

Basic-Calibration Sheet	p/n 6799A201 (Fig. 7-1, page 135)
IT8 Color Calibration Sheet, CHROMA	p/n 6799A122 (Fig. 7-2, page 136)
IT8 Color Calibration Sheet, MAGNUM	p/n 6799A107 (Fig. 7-3, page 137)

To avoid vertical lines in the scanned image, make sure that the Glass Plate and the White Background Plate are thoroughly cleaned before running Calibrate Scanner.

Procedure:

Start WIDEimage

Select Scan/Calibrate Scanner

Follow the instructions given on the screen.

Fig. 7-1 Basic-Calibration Sheet

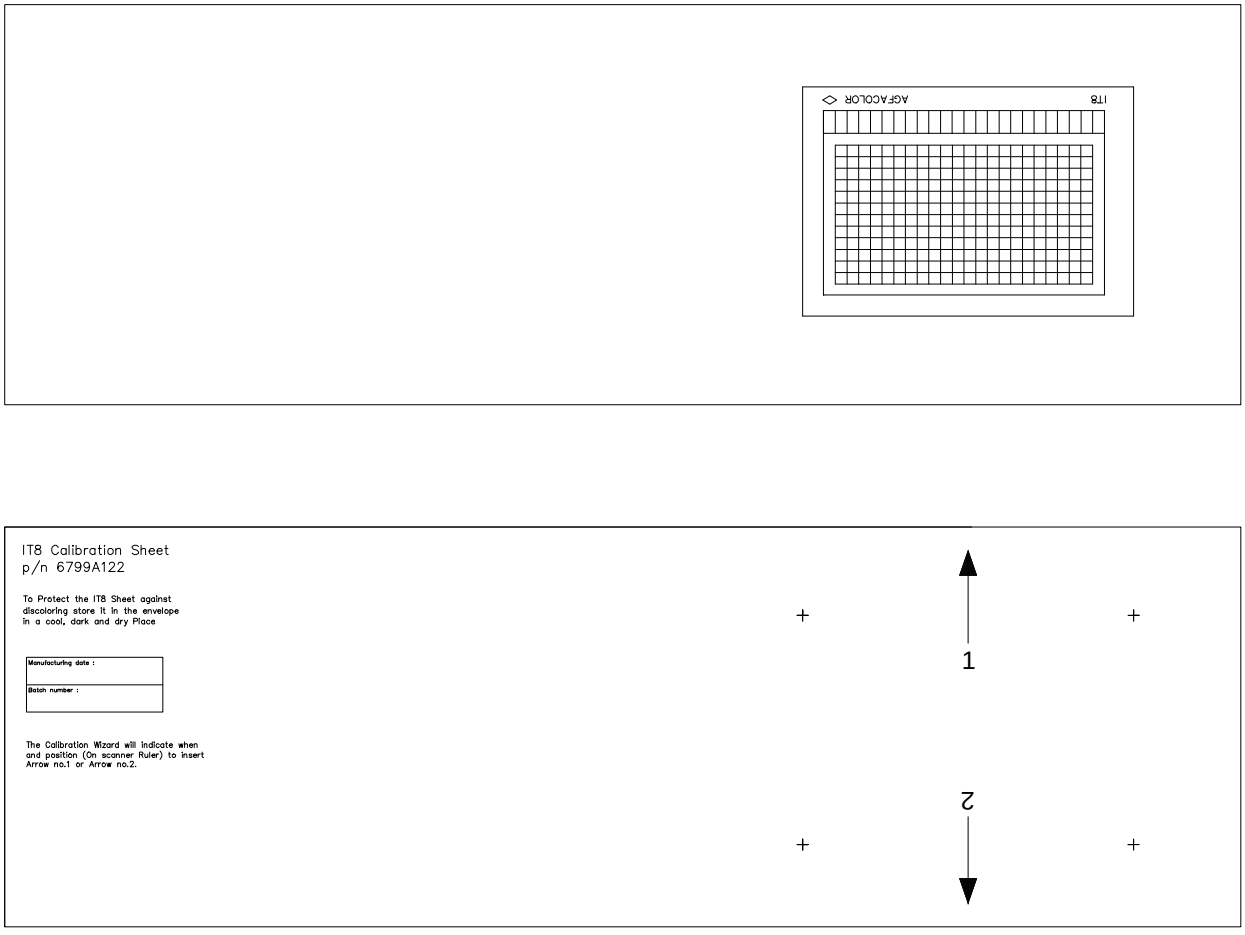

IT8 Calibration Sheet
p/n 6799A122
To Protect the IT8 Sheet against discoloring store it in the envelope in a cool, dark and dry Place
Manufacturing date :
Batch number :
The Calibration Wizard will indicate when and position (On scanner Ruler) to insert Arrow no.1 or Arrow no.2.
1
2

Fig. 7-2 IT8 Color Calibration Sheet, CHROMA

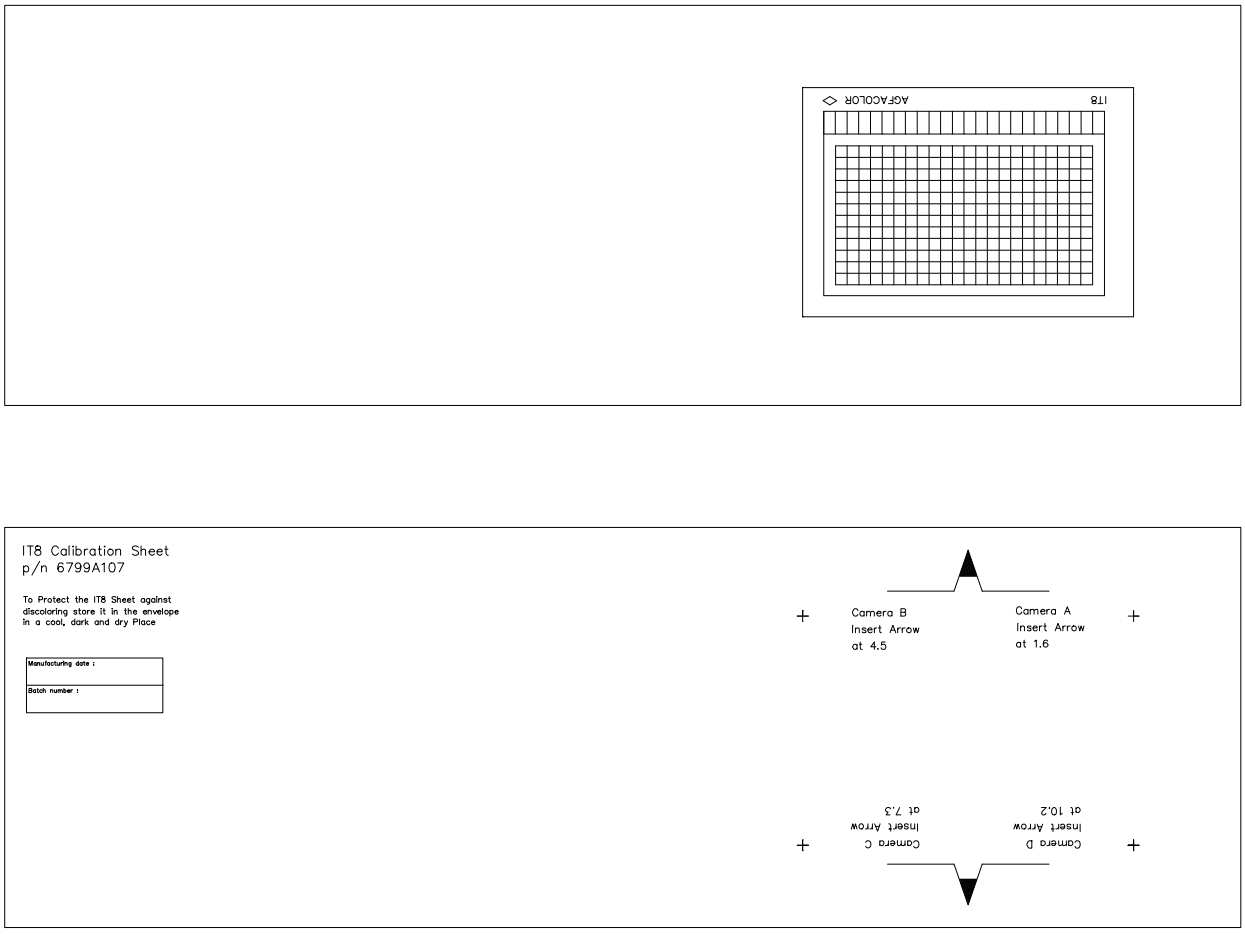


Fig. 7-3 IT8 Color Calibration Sheet, MAGNUM

8. Troubleshooting

8.1 Power-On Self-Test

The following operations are executed when the scanner is switched ON:

Operation	Description	Error Code
Check Scanner ID	Checks if the setting of the DIP switch on the Operator Panel is valid. Check if Smart Card is valid for the scanner type. All Indicators are ON.	Error 8
Hardware Self-Test	Checks SUA- and CBC/CBB-Boards. All Indicators are ON	Error 40 Error 50
Start motor to position Original	Tries to position the Original if one or both of the Original Sensors are activated. If both Entry and Exit sensors are activated, no time-out. Power and Wait Indicators are ON. If Light Profile Correction is suspended (see Section 2.5.3, page 19) the Wait Indicator blinks.	
Warm Up	Normally the Warm-Up time is app. 3 minutes. The Warm-Up time can be skipped by pressing the Forward and Reverse keys simultaneously. Power and Wait Indicators are ON.	
Light Profile Correction	The Light Profile is Corrected at power-on and thereafter whenever the scanner is idle and the Original Guide Plate is down in Normal position. Power and Wait Indicators are ON. If Light Profile Correction is suspended (see Section 2.5.3, page 19) the Wait Indicator blinks.	Error 30
Stitching	The scanner is Stitched at power-on and thereafter whenever the scanner is idle and the Original Guide Plate is down in Normal position. Power and Wait Indicators are ON. If Light Profile Correction is suspended (see Section 2.5.3, page 19) the Wait Indicator blinks.	Error 32

The hardware self test routines run every time the scanner is powered on or reset.

8.2 Error Codes

8.2.1 Error Codes displayed on the Operator Panel

An error condition is indicated by a flashing Diagnostic Indicator. The error may be identified by an Error Code Number being displayed on the screen and/or by the following combinations of flashing (F) indicators on the Operator Panel:

Diagnostic	Wait	Ready	Error Description
F	1 x F	OFF	Correction of Camera A failed
F	2 x F	OFF	Correction of Camera B failed
F	3 x F	OFF	Correction of Camera C failed

Diagnostic	Wait	Ready	Error Description
F	4 x F	OFF	Correction of Camera D failed
F	OFF	1 x F	Error on SUA-Board
F	OFF	2 x F	Error on CBC/CBB-Board
F	OFF	3 x F	Invalid Scanner ID setting
F	OFF	5 x F	Invalid Smart Card
F	F	F	Scanner is in Boot Mode
F	OFF	OFF	Refer to the Section below

OFF	F	OFF	Automatic update of Light Profile Correction has been suspended for a period exceeding the built-in update-timer scanner has been switched ON with the Original Guide Plate set for thick originals. See Section 2.5.3, page19.

1 x F, 2 x F, ... means that the Wait and/or the Ready Indicator flashes 1, 2, ... times every time the Diagnostic Indicator is turned ON.
F, F, F means that all three indicators are flashing simultaneously.

8.2.2 Error Codes displayed on the PC Screen

If SCANtest 4 is started when the scanner is in Error Mode, it will display the Error Code Number and a short description of the error.
The following error messages may be displayed:

Error Code and Description	Refer to page:
ERROR 08-147: Invalid Scanner ID Switch setting	142
ERROR 08-149: Invalid Smart Card for this scanner type	
ERROR 30-140: Correction of Camera A failed	
ERROR 30-141: Correction of Camera B failed	
ERROR 30-142: Correction of Camera C failed	
ERROR 30-143: Correction of Camera D failed	
ERROR 32-144: Stitching of Camera A/B failed	143
ERROR 32-145: Stitching of Camera B/C failed	
ERROR 32-146: Stitching of Camera C/D failed	
ERROR 40-35: CBx, Camera A not found	
ERROR 40-36: CBx, Camera B not found	
ERROR 40-37: CBx, Camera C not found	
ERROR 40-38: CBx, Camera D not found	
ERROR 40-39: CBx, Camera A AMP RAM error	
ERROR 40-40: CBx, Camera B AMP RAM error	
ERROR 40-41: CBx, Camera C AMP RAM error	
ERROR 40-42: CBx, Camera D AMP RAM error	
ERROR 40-43: CBx, Camera A EVEN LINE RAM error	
ERROR 40-44: CBx, Camera B EVEN LINE RAM error	
ERROR 40-45: CBx, Camera C EVEN LINE RAM error	143

Error Code and Description	Refer to page:
ERROR 40-46: CBx, Camera D EVEN LINE RAM error	
ERROR 40-47: CBx, Camera A ODD LINE RAM error	
ERROR 40-48: CBx, Camera B ODD LINE RAM error	
ERROR 40-49: CBx, Camera C ODD LINE RAM error	
ERROR 40-50: CBx, Camera D ODD LINE RAM error	
ERROR 40-75: CBx, FPGA CB status error	
ERROR 40-76: CBx, FPGA CB done error	
ERROR 40-134: Unable to Basic Calibrate	
ERROR 40-137: Unable to Calibrate Pixel Offset	
ERROR 40-170: Camera A, Unable to calibrate analog offset	
ERROR 40-171: Camera B, Unable to calibrate analog offset	
ERROR 40-172: Camera C, Unable to calibrate analog offset	
ERROR 40-173: Camera D, Unable to calibrate analog offset	
ERROR 40-174: Camera A, Unable to calibrate analog gain	
ERROR 40-175: Camera B, Unable to calibrate analog gain	
ERROR 40-176: Camera C, Unable to calibrate analog gain	
ERROR 40-177: Camera D, Unable to calibrate analog gain	
ERROR 40-182: Camera A, Time-out, calibrating analog part	
ERROR 40-183: Camera B, Time-out, calibrating analog part	
ERROR 40-184: Camera C, Time-out, calibrating analog part	
ERROR 40-185: Camera D, Time-out, calibrating analog part	
ERROR 50-17: SUx, Register 1 error	143
ERROR 50-18: SUx, Register 2 error	
ERROR 50-19: SUx, Register 3 error	
ERROR 50-20: SUx, Register 6 error	
ERROR 50-21: SUx, Register 8 error	
ERROR 50-22: SUx, FPGA01 register error	
ERROR 50-23: SUx, FPGA03 register error	
ERROR 50-24: SUx, FPGA04 register error	
ERROR 50-25: SUx, FPGA05 register error	
ERROR 50-26: SUx, FPGA06 register error	
ERROR 50-27: SUx, FPGA07 register error	
ERROR 50-28: SUx, FPGA08 register error	
ERROR 50-29: SUx, SCSI 0 reset error	
ERROR 50-30: SUx, SCSI 0 register error	
ERROR 50-31: SUx, SCSI 0 FIFO error	
ERROR 50-32: SUx, SCSI 1 reset error	
ERROR 50-33: SUx, SCSI 1 register error	
ERROR 50-34: SUx, SCSI 1 FIFO error	
ERROR 50-51: SUx, DB 0 reset error	
ERROR 50-52: SUx, DB 0 count error	
ERROR 50-53: SUx, DB 0 data error	
ERROR 50-54: SUx, DB 1 reset error	
ERROR 50-55: SUx, DB 1 count error	
ERROR 50-56: SUx, DB 1 data error	
ERROR 50-57: SUx, CNTL RAM error	
ERROR 50-58: SUx, LIN RAM error	
ERROR 50-59: SUx, GAMMA RAM error	143
ERROR 50-60: SUx, INDEX RAM error	

Error Code and Description	Refer to page:
ERROR 50-61: SUx, LUT ATBS error	
ERROR 50-62: SUx, LUT A error	
ERROR 50-63: SUx, LUT B error	
ERROR 50-64: SUx, LUT C error	
ERROR 50-65: SUx, Color space converter data error	
ERROR 50-66: SUx, Color space converter coefficient error	
ERROR 50-67: SUx, Position counter reset error	
ERROR 50-68: SUx, Position counter count error	
ERROR 50-69: SUx, Data path error	
ERROR 50-70: SUx, Data path length error	
ERROR 50-71: SUx, FPGA 8k status error	
ERROR 50-72: SUx, FPGA 8k done error	
ERROR 50-73: SUx, FPGA 10k status error	
ERROR 50-74: SUx, FPGA 10k done error	
ERROR 50-90: Sector in writeable area of FLASH is locked	
ERROR 50-91: Parameter block erasure failed	
ERROR 50-92: Parameter block write failed	
ERROR 50-93: Profile block erasure failed	
ERROR 50-94: Profile block write failed	
ERROR 50-100: pad task creation failed	
ERROR 50-101: pcd task creation failed	
ERROR 50-102: pbl task creation failed	
ERROR 50-103: err task creation failed	
ERROR 50-104: pio task creation failed	
ERROR 50-105: pop task creation failed	
ERROR 50-106: psn task creation failed	
ERROR 50-107: psc task creation failed	
ERROR 50-108: psi task creation failed	
ERROR 50-109: psp task creation failed	
ERROR 50-110: pts task creation failed	
ERROR 50-111: pto task creation failed	
ERROR 50-112: mbPad creation failed	
ERROR 50-113: mbPbl creation failed	
ERROR 50-114: mbPcd creation failed	
ERROR 50-115: mbPio creation failed	
ERROR 50-116: mbPsi creation failed	
ERROR 50-117: mbPsp creation failed	
ERROR 50-118: mbPts creation failed	
ERROR 50-119: mbPio pending	
ERROR 50-120: hmm out of memory	
ERROR 50-121: hmm un-allocated memory block	
ERROR 50-122: pop request failed, position unknown	
ERROR 50-123: pop request failed, invalid command	
ERROR 50-124: pio event	
ERROR 50-125: psi event	
ERROR 50-126: pcd event	
ERROR 50-127: psc event	
ERROR 50-128: psi message event	
ERROR 50-130: semPsp posted more than once	143
ERROR 50-131: psp received unknown mail	
ERROR 50-132: mrsErrorTbl missing entry	

Error Code and Description	Refer to page:
ERROR 50-133: unknown reboot command	
ERROR 50-190: pbl received invalid mail	
ERROR 50-191: mbPss creation failed	
ERROR 50-192: pss task creation failed	
ERROR 50-193: mbPss pending	
ERROR 50-194: pss event	
ERROR 50-195: stitch write failed	
ERROR 50-196: pmb validation failed	
ERROR 50-197: pointer out of range	
ERROR 50-198: unknown camera board	
ERROR 50-199: unknown SUx/CCD combination	

8.3 Troubleshooting Hints

The scanner does not power-up

- Check the power supply connections.
- Check that all cable connectors are properly inserted into their sockets.
- Check voltages on the SMPS.
- Check the supply voltages on the LMD-, CBC/CBB- and SUA-Boards.

Error 08-147, 'Invalid Scanner ID'

- Error 08-147 indicates that the DIP Switch (pos. 4, 5, 6, 7, and 8) on the Operator Panel is set to an undefined scanner type, see Section 3.8.4, page 50.
- Error 08-147 may also indicate a bad connection between the SUA-Board and the Operator Panel.

Error 08-149, Invalid Smart Card

- The Smart Card is not valid for this scanner type
- Error 08-149 may also indicate a bad connection between the SUA-Board and the Smart Card Reader.

Error 30-140 to 30-143, Light Profile Correction Failed
(Referred to as 'Out of Light' Error in the Operator's Guide)

Error 30 is displayed if more than 200 consecutive pixels or a total of 1500 pixels can not be adjusted up to the required White-Signal Level.

- Error 30 is most often caused by dirt on the Glass Plate or the White Background Plate and the first step should be to make sure that these parts are clean.
  Next, check the Light Profiles, see Section 4.2.1, page 64 (or if no oscilloscope is available scan with SCANtest 4, Test 10 as described in Section 6.1, page 108).

If the Light Profile is distorted, the cause may be:

- Lamps does not turn ON.
- Corrupted Basic Calibration.
- Defective CBC/CBB-Board.

It is possible to override Error 30 from WIDEimage and go through with the scanning. Whether the result will be useful or not depends on the cause of Error 30.

Error 32-144 to 32-146, Stitching Failed

It has not been possible for the processor to detect the image of the Stitching Wire in the scanned input.

- Error 32 may be caused by dirt on the Glass Plate or the White Background Plate in the areas opposite the Stitching Wire, and the first step should be to make sure that these parts are clean.
- White dust on the Stitching Wire (check the image of the Stitching Wire with Test 9 (oscilloscope) or Test 10).
- The Stitching Wire is broken.
- One of the CCD-Cameras is so much out of focus, that the image of the Stitching Wire does not reach down below the Stitching Threshold level which is approximately 50% of the Corrected White-Signal level (check the image of the Stitching Wire with Test 10).
- The CCD-Centering of one of the CCD-Cameras may be so much out of adjustment, that the image of the Stitching Wire falls outside the range where it can be detected by the scanner (check CCD-Centering with Test 9 (oscilloscope) or Test 10).
    - Erase Parameter Blocks, 3.2.1, page 34.
    - Run Basic Calibration.
- Replace SUA-Board.

Error 40-35 to 40-50 and 40-75, 40-76, CBC/CBB-Board Errors

- Run SCANtest 4, Test 7 to verify the error.
- Check that all cable connectors are properly seated into their sockets.
- Check the supply voltages on the boards.
- Replace CBC/CBB-Board.

Error 40-134, 40-170 to 40-185, CBC/CBB-Board Errors

- Run SCANtest 4, Test 7 to verify the error.
- Check that all cable connectors are properly seated into their sockets.
- Check the supply voltages on the boards.
    - Check Light Profiles (Section 4.2.1, page 64 or, if no oscilloscope is available, scan with SCANtest 4, Test 10 as described in Section 6.1, page 108).
- Erase Parameter Blocks (Section 3.2.1, page 34).
- Run Basic Calibration.
- Replace CBC/CBB-Board.

Error 50-17 to 50-34, 50-51 to 50-76 and 50-90 to 50-133,50-190 to 50-180, SUA-Board Errors

- Run SCANtest 4, Test 7 to verify the error.
- Check that all cable connectors are properly seated into their sockets.
- Check the supply voltages on the board.
- Replace SUA-Board.

Original Feed Problems

If the Stepper Motor does not run:

- Check supply voltage on the SMPS and LMD-Board, Section 3.3, page 35 and Section 3.4, page 38.
- Remove the Stepper Motor cable connector from J9 on the LMD-Board and check the resistance of the two windings of the Stepper Motor. One of the two windings is connected to pos. 1 and pos. 2 and the other to pos. 3 and pos. 4 of the cable connector. The resistance should be approximately 3.7 ohms.

If the Stepper Motor is overloaded (high noise level, original feed problems):

- Check supply voltage and the Stepper Motor Reference Voltages on the LMD-Board, Section 3.4, page 38.

Streaking (Vertical Lines)

Vertical Lines running from top to bottom of the scanned image are often caused by dust or dirt on the Glass Plate.
A description of how to locate the cause of vertical lines in the scanned image is given in:

Section 11.1.14, Test 20, Noise Test, page 160.

If it has been necessary to remove a CBC/CBB-Board for replacement or for cleaning of the CCD-chip, refer to Chapter 4, page 60 for adjustment instructions.

9. Disassembly and Assembly

Refer to the following figures:

Fig. 10-1 Transmission, page 153.
Fig. 10-2 Drive-Belt Tightener, page 154.
Fig. 10-3 Scanner Cross Section, page 155.

CAUTION:
Before removing any covers, turn the power switch OFF and disconnect the power cord.

The following Sections describe disassembly. For assembly, use the same procedures in reverse order.

9.1 Top Cover with Front Profile

Remove the three fixing screws along the lower edge of the Front Profile.

Pull the Front Profile away from the scanner to get the upper edge of the Top Cover off the heads of the guide screws.
Now, the Top Cover with Front Profile may be lifted off.

Check Vertical Alignment after replacement of Top Cover, see Section 5.2.1, page 95.

Note: On *MAGNUM scanners up to s/n 00275, the Smart Card Reader is mounted inside the Top Cover. On these scanners, be very careful not to damage the cable between the SUA-Board and the Smart Card Reader when removing and replacing the Top Cover. Remember to reconnect the cable when replacing the Top Cover.*

9.1.1 Front Profile

Remove the Top Cover.

Remove the two end covers of the Front Profile.

Loosen the four fixing nuts for the Front Profile (located inside the Top Cover).

Slide the Front Profile off in the direction opposite the Smart Card Reader.
On early MAGNUM scanners, keep the Smart Card Reader drawer pushed fully in while sliding the Front Profile.

9.1.2 Smart Card Reader on MAGNUM, up to s/n 00275

Remove the Top Cover.

Remove the Front Profile.

Remove the two fixing screws and the nine fixing nuts for the box with the Smart Card Reader.

The box with the Smart Card Reader may now be removed giving access to the Smart Card Reader.

To replace the Smart Card reader, reverse the order of removal.

9.2 End Covers

Remove the Top Cover.

Remove the Original Guide Plate.

Remove the two M4 fixing screws under the Top Cover, one M4 fixing screw under the Original Guide Plate, and four M3 fixing screws along the lower edge of the End Covers. On the right End Cover, two of the M3 screws are placed 50 mm above the lower edge, these screws must be M3x6 mm. If they are longer, they may touch the Mirror Chassis and disturb the camera adjustment when tightened.

9.3 Rear Cover

Remove the five fixing screws along the centerline of the Rear Cover and the four fixing screws along the lower edge of the Rear Cover.

The Rear Panel may now be detached.

9.4 Bottom Plate

Remove the End Covers.

Remove the Rear Cover.

Remove the two fixing screws, one on the left and one on the right side plate.
Do not grip on the Mirror Chassis when lifting the scanner for removal of the Bottom Plate.

Note: On MAGNUM scanners up to s/n 00334, the Bottom Plate is integrated with the Rear Cover (in one piece). On these scanners, the Bottom Plate is removed with the Rear Cover.

9.5 Top Profile (Lid)

Release the lock screw in one of the bearings of the Top Profile.

Slide the bearing off the pivot.

Lift off the Top Profile.

9.6 Glass Plate

The Glass Plate is hinged on two small brass bearings, one on each side plate.

Remove the mounting screws for the two bearings and lift off the Glass Plate.
When replacing the Glass Plate, the bearing should be mounted with the flange against the side plate.

9.7 Entry Roller Shield

Remove the Top Cover.

Remove the Original Guide Plate.

Remove the two front most guide pins for the Original Guide Plate.

Remove the Glass Plate (be careful not to loose the two bearings when lifting off the Glass Plate).

Loosen (do not remove) the twenty fixing screws (10 Allen screws and 10 screws with 6mm hexagonal head) on the front side of the Entry Roller Shield.
Caution: *Do not loosen the two fixing screws (5.5 mm hexagonal heads or Allen screws secured by seal lacquer) for the center-bearing of the Feed Roller.*

Gently remove the Entry Roller Shield (be careful not to bend or in any other way damage the shield).

When replacing the Entry Roller Shield, the Glass Plate must be mounted and closed down before tightening the twenty fixing screws of the Entry Roller Shield. While tightening the screws, gently press the Entry Roller Shield downwards so that the rear edge of the Entry Roller Shield is in contact with the edge of the Glass Plate. This is to prevent the original from being caught by the edge of the Entry Roller Shields when it is moving backwards.

9.8 Exit Roller Shield

Remove the Top Profile (Lid).

Remove the Original Guide Plate.

Remove the two rear guide pins for the Original Guide Plate.

Remove the left and right hinges for the Top Profile (Lid).

Remove the Rear Cover.

Loosen (do not remove) the twenty fixing screws (10 Allen screws and 10 screws with 6mm hexagonal head) on the rear of the Entry Roller Shield.
Caution: *Do not loosen the two fixing screws (5.5 mm hexagonal heads or Allen screws secured by seal lacquer) for the center-bearing of the Feed Roller.*

Gently remove the Entry Roller Shield (be careful not to bend or in any other way damage the shield).

When replacing, gently press the Exit Roller Shield downwards while tightening the fixing screws.

9.9 Mirror Chassis

Remove all Covers.

Turn scanner upside down.

Remove the brackets with the two rear rubber feet.

Remove the four 4 mm nuts and washers (on the outside of the side plates) that hold the Mirror Chassis.

Pull out the four tight-fitting bolts (two on each end).

The Mirror Chassis is now free to be lifted out.

To replace the Mirror Chassis, reverse the order of removal.
Always clean the mirrors before replacing the Mirror Chassis.

After replacement of the Mirror Chassis and Covers:

Check Camera Adjustment, Chapter 6, page 108*, especially Vertical Positioning, Section 6.3, page 120.*
Stitching and Vertical Alignment, Section 5.3, page 99.
WIDEimage, Calibrate Scanner

9.10 Reflector Assembly

Remove all Covers.

Remove Glass Plate.
This is to prevent scratching of the Glass Plate when removing and replacing the Reflector Assembly.

Remove the Fluorescent Lamps.

Turn the scanner upside down.
Do not grip on the Mirror Chassis.

Remove the Mirror Chassis.

Disconnect the cables from the OSB-Boards.
Note that the cables are marked F and R referring to the front respectively rear OSB-Board.

Turn the cable plugs so that the two polarizing ribs point away from the slot of the Reflector Assembly and push the plug down through the cutout in the Reflector Assembly. The cables are now free to be pulled out through the opening in the side plate.
To re-install the cables, turn the cable plug so that the two polarizing ribs are pointing away from the slot of the Reflector Assembly, grip the plug with flat-nose pliers and - through the opening in the side plate - push the plug up though the cutout in the Reflector Assembly.

Remove the sixteen screws that hold the Reflector Assembly.

Lift out the Reflector Assembly.
To prevent damage to the Stitching Wires when replacing the Reflector Assembly, the notches in the Reflector Assembly should be aligned with the Stitching Wires. This may be done by carefully keeping the holes for the fixing screws aligned with the holes in the scanner chassis.

10. Replacement of Parts

Refer to the following figures:

Fig. 10-1 Transmission, page 153.
Fig. 10-2 Drive-Belt Tightener, page 154.
Fig. 10-3 Scanner Cross Section, page 155.

CAUTION:
Before removing any covers, turn the power switch OFF and disconnect the power cord.

The following Sections describe removal of parts. For replacement, use the same procedures in reverse order.

10.1 Feed Roller Shaft

Remove the Entry respectively Exit Roller Shield.

Remove the Guard Plate over the OIB-Board.

Remove the OIB-Board.

Remove the Original Sensor Shutter.

Detach the Torsion Spring from the Sensor Arm.
The Sensor Actuators are now free to be turned into an upright position allowing the Feed Roller Shaft to be lifted out.

Remove the Drive Belt from the pulley.
When replacing, check and if necessary adjust the Drive Belt tension, see Fig. 10-2, page 154.

Loosen the two lock screws and pull off the pulley, be careful not to loose the joint tongue in the shaft.
A dismantling screw may be useful for pulling off the pulley.

Remove the two screws, which holds the bearing at the pulley end.

Pull off the bearing and washers, note the number of washers for later replacement.

Remove the top part of the center bearing.
The top parts of the center bearings of the Entry and Exit Roller Shafts must not be interchanged, therefore please mark the top part before removal.

Lift the shaft at the pulley end and slide the bearing (bushing) out of the support.

Slide the shaft towards the pulley end to pull it out of the bearing at the opposite end.
Hold on the center of the shaft and flex it a little to allow the Feed Rollers to pass the bearings of the Original Sensor Actuators.

When removing the shaft, note the number and position of the washers on the end of the shaft for later replacement.

Raise the Original Sensors Actuators to upright position.

Lift out the Feed Roller Shaft.

After replacement, readjust the Original Sensors, see Section 3.12, page 57.

10.2 Original Sensor Actuators

Remove the Feed Roller Shaft.

Remove the Torsion Spring from the actuator.

Loosen (do not remove) the screws holding the bearings of the actuator just enough to allow the Original Sensor Actuator to be lifted out of the bearing.

Remove the Original Sensor Actuator.

After replacement, readjust the Original Sensors, see Section 3.12, page 57.

10.3 Stitching Wire

Remove the Reflector Assembly.

Remove the fixing screws, clamps, and leaf springs for the Stitching Wire and remove the defective wire.

When replacing the Stitching Wire, make sure that it is placed in the notches of the leaf springs.
The Stitching Wire should be tightened to give a deflection of about 2 mm on each of the two leaf springs.

10.4 Fluorescent Lamps

CAUTION:
Turn the power switch OFF and disconnect the power plug.

Remove the Top Cover.

Remove the Original Guide Plate.

Remove the End Cover at the Power Inlet end.

Remove the fixing screw under the Lamp Holder.
Make sure, that the two cables for the Lamp Sensors do not get caught when replacing the Lamp Holder.

Pull off the Lamp Holder.

The Fluorescent Lamp may now be pulled out.

Be careful not to touch the Stitching Wires when removing and replacing the lamp.

To replace the Fluorescent Lamp, reverse the order of removal.

After replacement:

Check and if necessary adjust the Lamp Driver, Section 3.4.2, page 38.

Replace all covers.

Run WIDEimage, Calibrate Scanner.

Check, and if necessary adjust, Stitching and Vertical Alignment of the CCD-Cameras, see Chapter 5, page 94.

10.5 Stepper Motor

See Fig. 10-1, page 153.

Remove the Original Guide Plate.

Remove the Top Cover.

Remove the End Cover at the Power Inlet end.

Remove the Drive Belt from the pulley.
When replacing, check and if necessary adjust the Drive Belt tension, see Fig. 10-2*, page 154.*

Loosen the two screws which locks the Drive Pulley to the motor shaft.
When replacing, the drive pulley with washer should just touch the bearing bracket before the lock screws are tightened.

Remove the three fixing screws holding the bearing bracket for the drive pulley.

Pull off the bracket.
Note the washer between the bracket and drive pulley.

Pull off the Drive Pulley.

Remove the three nuts which hold the Stepper Motor.
For removal and replacement: Use a 6 mm spanner on the hexagonal stays inside the side plate to counteract twisting of the rubber dampers.

The Stepper Motor is now free to be removed.

10.6 Lamp Sensor Board, OSB

Remove all Covers.

Remove the Mirror Chassis.

There is now free access to the Lamp Sensor Board.

After replacement:

Readjust the Lamp Driver, Section 3.4.2, page 38.
Check Camera Adjustment, Chapter 6, page 108*, especially Vertical Positioning, Section 4.2.5, page 84*
Stitching and Alignment, Chapter 5, page 94.
WIDEimage, Calibrate Scanner

10.7 Dust Filter on Fan

Remove Top Cover.

The dust filter may now be removed, and a new filter clicked on to the fan.

10.8 White Background Plate

Remove the Original Guide Plate from the scanner.

Place the Original Guide Plate with the front down.

Remove the two fixing screws for the Stop Bracket at one end of the Original Guide Plate.

Lift out the Stop Bracket.

Pull out the White Background Plate.

After replacement:

Run Basic Calibration or WIDEimage, Calibrate Scanner

10.9 Slider for Media Thickness Adjustment

Remove the Original Guide Plate from the scanner.

Place the Original Guide Plate with the front down.

Remove the two fixing screws and guide bushings for the Adjustment Slider.

The Adjustment Slider may now be removed.

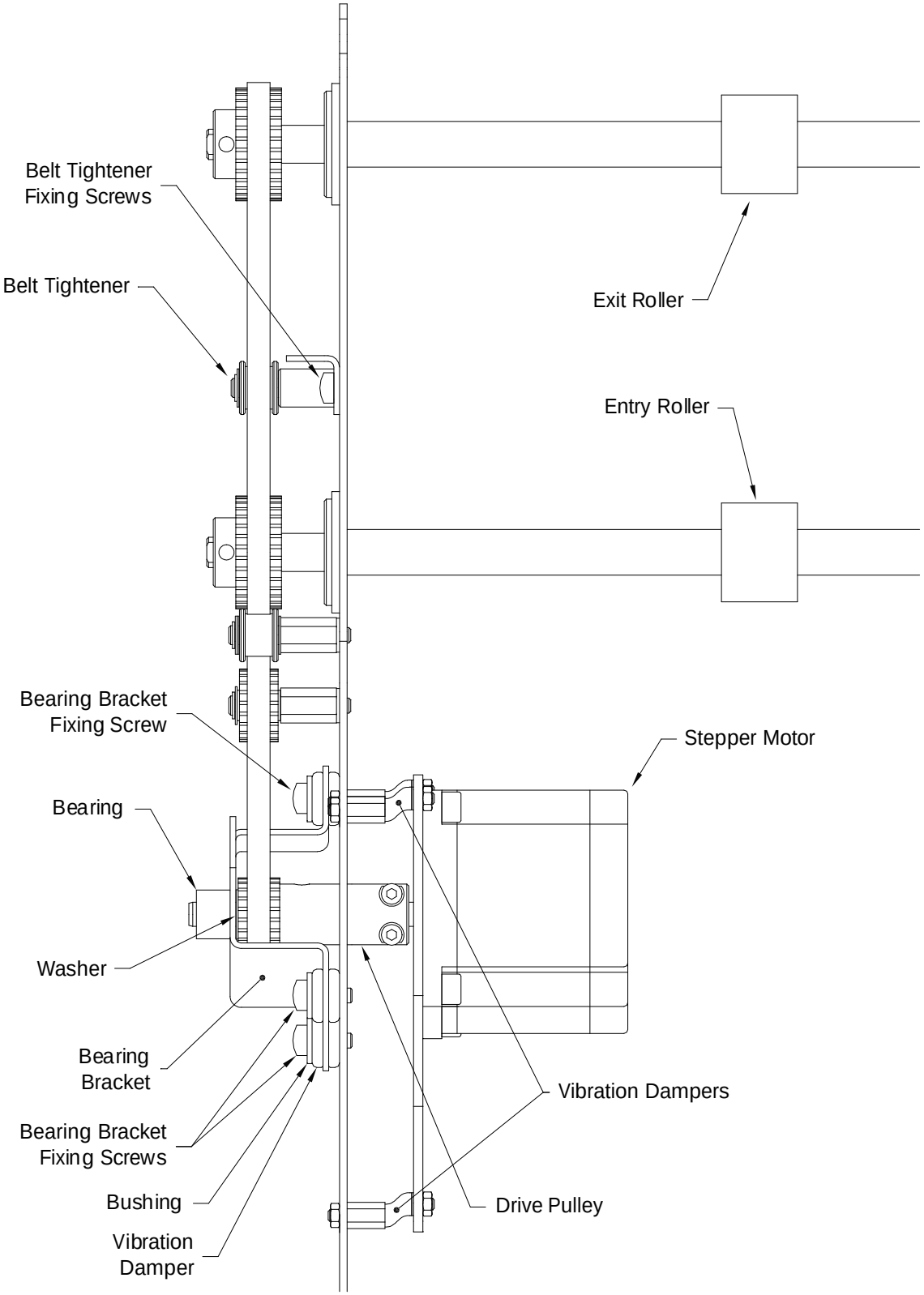


Fig. 10-1 Transmission

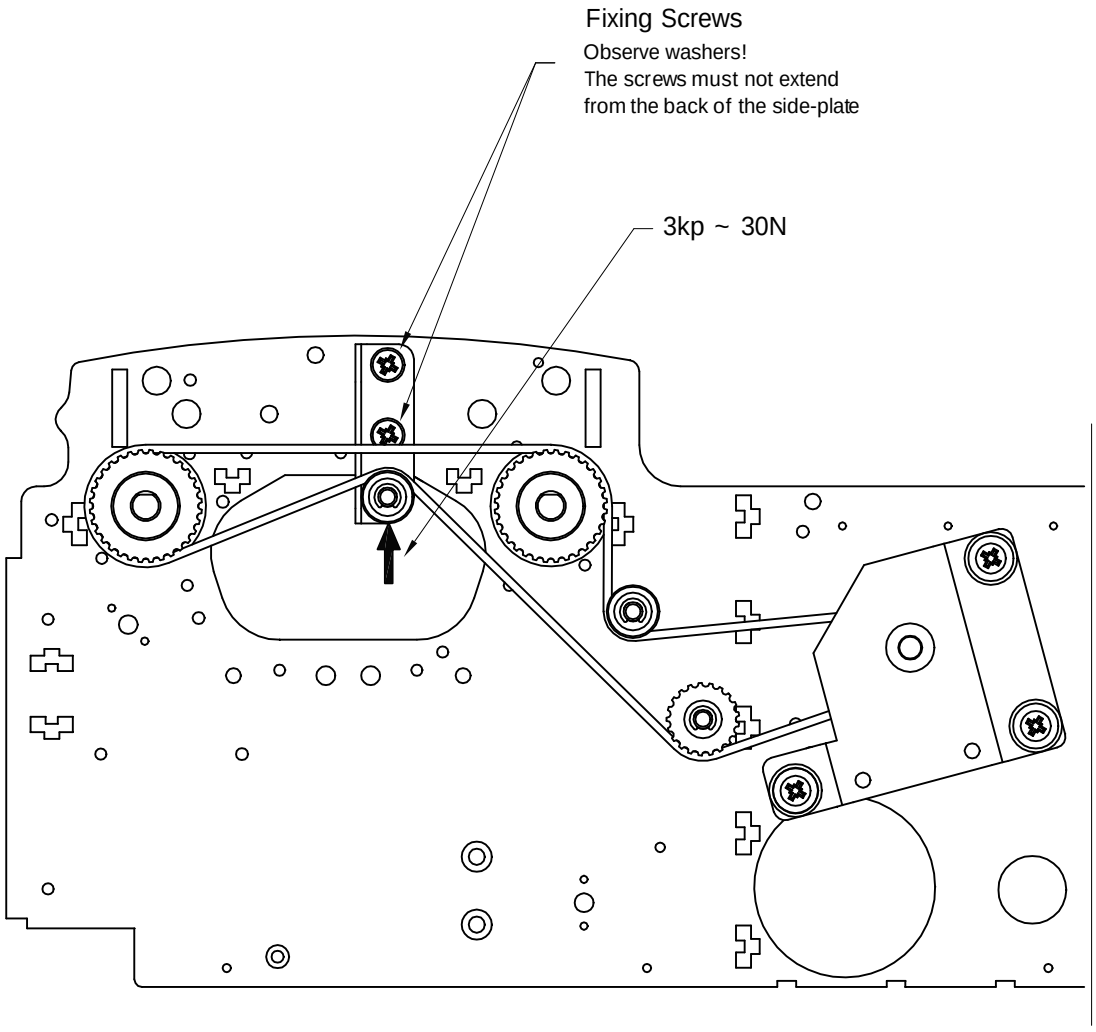


Fig. 10-2 Drive-Belt Tightener

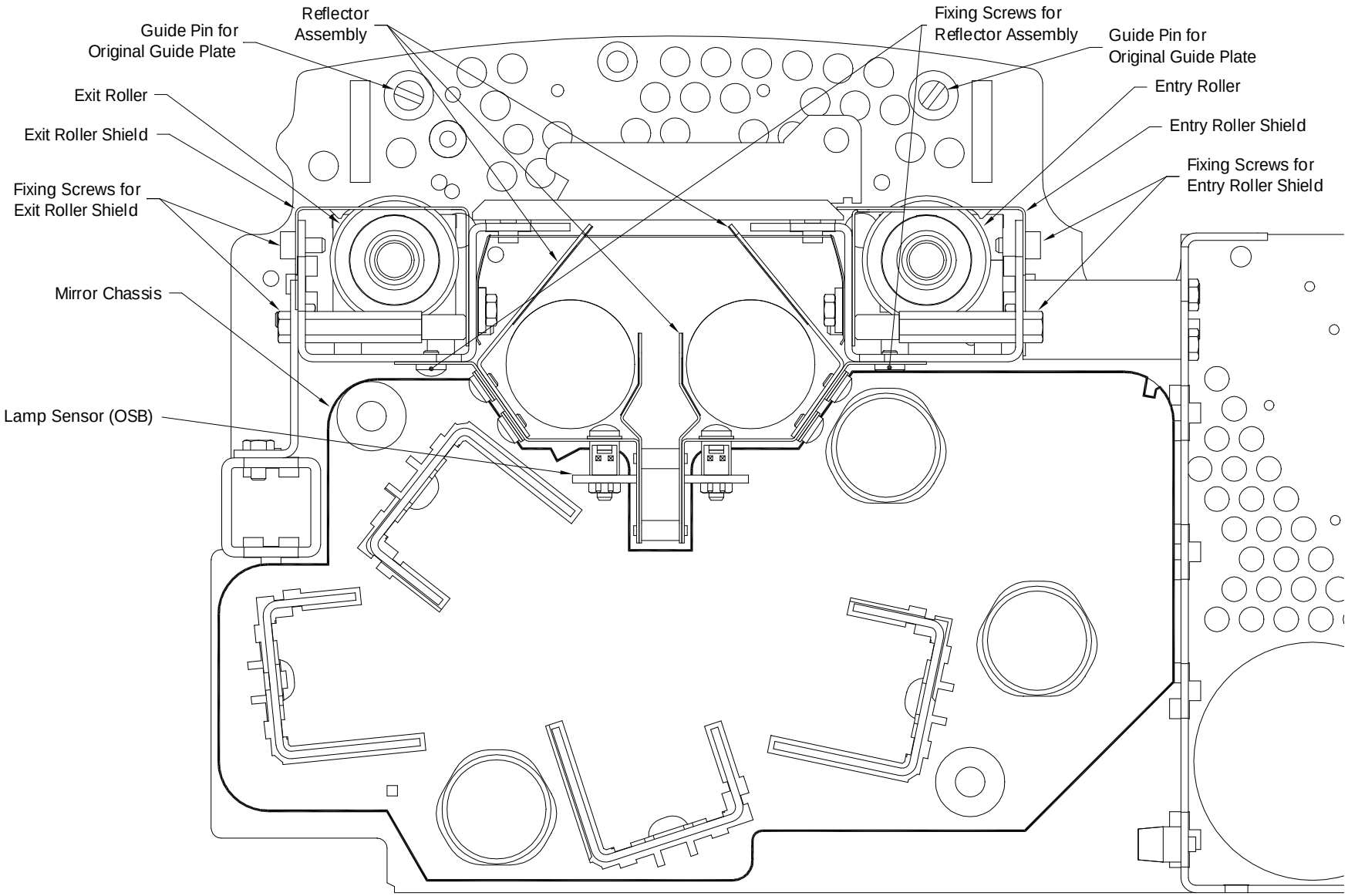


Fig. 10-3 Scanner Cross Section

11. SCANtest 4

The purpose of the scanner test program, SCANtest 4, is to support troubleshooting and adjustment of the Wide Format Scanners.

SCANtest 4 for Win95/98/NT is found on two disks included with this manual. Please refer to the *readme.txt* file on the disk for installation instructions.

The CHROMA and MAGNUM scanners are supported by SCANtest 4, rel. 6 or higher and the PANORAMA and CRYSTAL scanners by SCANtest 4, rel. 8 or higher.

When SCANtest 4 has been started, the scanner is switched into Test Mode, and the Diagnostic Indicator on the Operator Panel is turned ON.

Scanner Test Program Menu

Test 1:	Scanner Information
Test 2:	LED Test
Test 3:	Key Test
Test 4:	Original-Sensor Test
Test 5:	Lamp Test
Test 6:	Motor Test
Test 7:	Complete Hardware Test
Test 9:	Camera Adjustment *)
Test 10:	Check Camera Adjustments
Test 11:	Stitching and Vertical Alignment
Test 12:	Adjust Y-Axis Scaling
Test 13:	Switch Scanner to Test Mode
Test 16:	Basic Calibration
Test 20:	Noise Test
Test 21:	SCANdump

If SCANtest 4 is started when the scanner is in Error Mode, the Error Code Number and a short description of the error will be displayed on the screen.

*) SCANtest 6, rel. 1 *and* firmware rel. 0031 or later supports “Software Oscilloscope” in Test 9.

Description of SCANtest 4

11.1.1 Test 1, Scanner Information

Purpose: To display the result of the SCSI Inquiry.

The following is displayed:

Scanner Model:
Firmware Release:
Firmware Release Date:
Executable Revision:
FPGA Revision:
FPGA Release Date:
Boot Code Revision:
Boot Code Release Date:
Download Control Switches:
Scanner ID Switch:
SCSI ID:

11.1.2 Test 2, LED Test

Purpose: To test the LED Indicators on the Operator Panel.

Description:
Starting with the Wait LED, all LEDs, except the Power LED, are sequentially switched ON/OFF until Test 2 is terminated. The Power LED is constantly ON.

11.1.3 Test 3, Key Test

Purpose: To test the Keys on the Operator Panel.

Description
Each key on the Operator Panel will turn the Ready LED and the Wait LED ON when pressed. The Power LED and the Diagnostic LED are constant ON.

11.1.4 Test 4, Original-Sensor Test

Purpose: To test the Original Sensors and the Media Thickness Detector.

Description:
The Ready LED and the Wait LED turns ON when one of the Original-Sensors is activated, or when the right hand Adjustment Slider for Media Thickness is pulled out from Normal position

11.1.5 Test 5, Lamp Test

Purpose: To test the Lamp and associated electronics.

Description: A message on the screen will inform whether the **Lamp** is turned ON or OFF (Lamp power is turned ON/OFF) and whether the **Light** is ON/OFF (Light is detected or not). The Lamp is delayed approx. 2 seconds when switched ON.

11.1.6 Test 6, Motor Test

Purpose: To test the Feed Motor and associated electronics.

Description: From the menu the motor speed and the motor direction can be selected.

11.1.7 Test 7, Complete Hardware Test

Purpose: To test various functions on the SUA and CBC/CBB-Boards.

11.1.8 Test 9, Camera Adjustment

Purpose: To support CCD-Camera adjustments when using an oscilloscope.

Description: The following functions can be selected from the Test Program Menu.

- Select Uncorrected or Corrected Light Profile (Uncorrected is default)
- Scan Red, Green, Blue, or All Colors (MAGNUM and CHROMA only)
- Toggle Lamp ON/OFF
- Software Oscilloscope *)

The corresponding signals may be measured at test point ANALOG_OUT on the CBC/CBB-Boards.
*) SCANtest 6, rel. 1 *and* firmware rel. 0031 or later supports "Software Oscilloscope" in Test 9.
Note: The signals at ANALOG_OUT are not valid when using Software Oscilloscope.

11.1.9 Test 10, Check Camera Adjustment

Purpose: To check the CCD-Camera adjustments by scanning the Uncorrected as well as Corrected Light Profiles of all channels.
Description: The Test 10 menu has the following choices:

- Select Color Channel Red, Green or Blue (MAGNUM and CHROMA only)
- Select Uncorrected or Corrected Light Profile and Execute
- Scan Camera A, B, C, D or All *)
- Save Light Profile to disk
- View Light Profile file
- Print Light Profile image

*) "Scan Cameras" does not initiate a Light Profile Correction. The cameras will be scanned with Corrected or Uncorrected Light Profile as set by the separate Light Profile Correction command.

The marker at the center of the upper edge of the image refers to the ruler on the scanner (in Scanner Units). The part of the image just below the marker is located opposite the corresponding value on the scanner ruler.

The spacing between the horizontal lines on the screen image corresponds to 20 graytone steps (full range 0 to 255 graytone steps).

11.1.10 Test 11, Stitching and Vertical Alignment

Purpose: To support Stitching and Vertical Alignment.

Description: After Test 11 has been selected and the Stitching Adjustment Pattern has been inserted, Test 11 will scan the selected Stitching Area and automatically return the original to its initial position ready for another scan. On MAGNUM and CHROMA scanners Test 11 works on the Green channel only.
The Stitching Area is selected and the scanning started from the Test 11 menu:

- Stitch Camera A/B
- Stitch Camera B/C
- Stitch Camera C/D
- Show Stitch Values
- View Stitch file

after scanning of the Stitching Adjustment Pattern, the following options are available:

- Rescan
- Alignment
- Set Stitch Values
- Save Stitch file
- Print Stitch image

The virtual end point respectively start point of the scanlines from adjacent cameras are adjusted in steps of one interpolated (2 x Optical dpi) pixel by setting the Stitch Value.
A greater Stitch Value decreases, and a smaller value increases the size of the ruler sub-division that crosses the line of stitching.
The Stitch Values are stored in the Flash Memory on the SUA-Board.

11.1.11 Test 12, Adjustment of Y-Axis Scaling

Purpose: To adjust the Y-Axis Scaling.

Description: The scaling (dpi) in the mechanical scan direction (Y-Axis) depends on the speed of the stepper motor relative to the scanline Exposure Time. The default motor speed can be changed ± 1%, either from Test 12 or by using the '*Scanner Setup/Correction factor ...'* option of WIDEimage.
The correction factor is stored in the Flash Memory on the SUA-Board.

11.1.12 Test 13, Switch Scanner to Test Mode

Purpose: To switch the scanner back to Test Mode. Useful if the scanner gets out of Test Mode, e.g. if it has to be turned OFF/ON during troubleshooting.

11.1.13 Test 16, Basic Calibration

Purpose: To set the Gain and Offset control circuits to adapt the signal level and the signal offset to the input-signal range of the following AD-Converter.

Description:
The level and offset of the RGB signals may vary from camera to camera, and each channel has Gain and Offset control circuits to adjust the signal level and the signal offset to match the input-signal range of the following AD-Converter.

The gain and offset parameters are adjusted by running Basic Calibration or WIDEimage, Calibrate Scanner and stored in the Flash Memory on the SUA-Board.

The Light Profile Correction of the scanner is based on two Light Profiles obtained during Basic Calibration (or WIDEimage, Calibrate Scanner):

- High resolution Light Profile of Basic-Calibration Sheet (BCS, stored in Flash Memory on the SUA-Board)
- Filtered Light Profile of the White Background Plate in the scanner (WBP, stored in Flash Memory on the SUA-Board)

11.1.14 Test 20, Noise Test

Purpose: To detect and locate the possible cause (dust, dirt, scratches,..) of vertical lines running from top to bottom of the scanned image.

Description: Test 20 scans a horizontal band of the Basic-Calibration Sheet and displays, for each color, the graytone values of each separate pixel averaged over the scanned band.
The displayed image of the Basic-Calibration Sheet will be superimposed by low level noise caused by the CCD chip, and larger spikes most likely caused by dust, dirt, scratches, or similar defects on the Glass Plate. In rare cases, larger spikes may be caused by dust, dirt, or pixel faults on the CCD chip.

The positions of larger spikes are shown by the numbers (Scanner Units) opposite to the spikes.

Larger spikes going downwards are often caused by dust, dirt, scratches, or similar defects on the Glass Plate and may be remove by cleaning the Glass Plate.
Downward spikes often show up as darker vertical lines in the scanned image, see Fig. 11-1, page 161.

Larger spikes going upwards are often caused by dust or dirt present on the Glass Plate during the last Basic Calibration or Calibrate Scanner. These defects are memorized by the Light Profiles stored in Flash Memory and can only be removed by cleaning of the Glass Plate followed by a new SCANtest 4, Basic Calibration or WIDEimage, Calibrate Scanner.
Upward spikes show up as very bright vertical lines in the scanned image.

White vertical lines in the scanned image may be found even if Noise Test shows a perfectly ‘clean’ scanner. In this case, the cause may be white dust or particles on the backside of the Glass Plate having the same color as the white background.

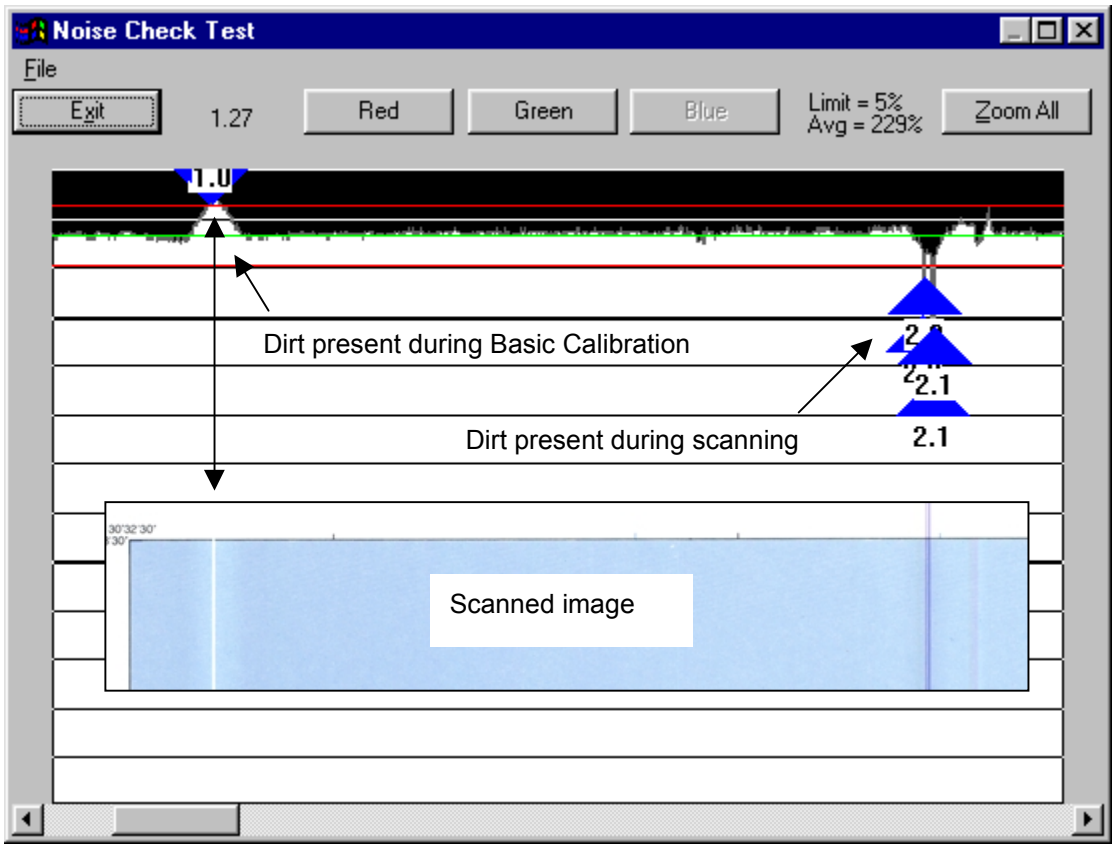


Fig. 11-1 Noise Test, Example

11.1.15 Test 21, SCANdump

Purpose: To create a file, SCANdump.con, which contains Light Profiles and other scanner data for diagnostics purposes.

Description: The file SCANdump.con will be placed in the directory pointed to by the SET TEMP environment variable.
The files contained in SCANdump.con may be unpacked by SCANview 4 by double clicking on SCANdump.con.
The unpacked Light Profiles may be viewed by SCANview 4. If other files are included use an appropriate reader or viewer.

12. Wiring Diagrams

This Section contains the following wiring diagrams:

Fig. 12-1 FSC x040 CHROMA Primary Wiring, page 164
Fig. 12-2 FSC x040 CHROMA Secondary Wiring, page 165
Fig. 12-3 FSC x050 MAGNUM Primary Wiring, page 166
Fig. 12-4 FSC x050 MAGNUM Secondary Wiring, page 167
Fig. 12-5 FSS 225x PANORAMA, CRYSTAL 40, Primary Wiring, page 168
Fig. 12-6 FSS 225x PANORAMA, CRYSTAL 40, Secondary Wiring, page 169

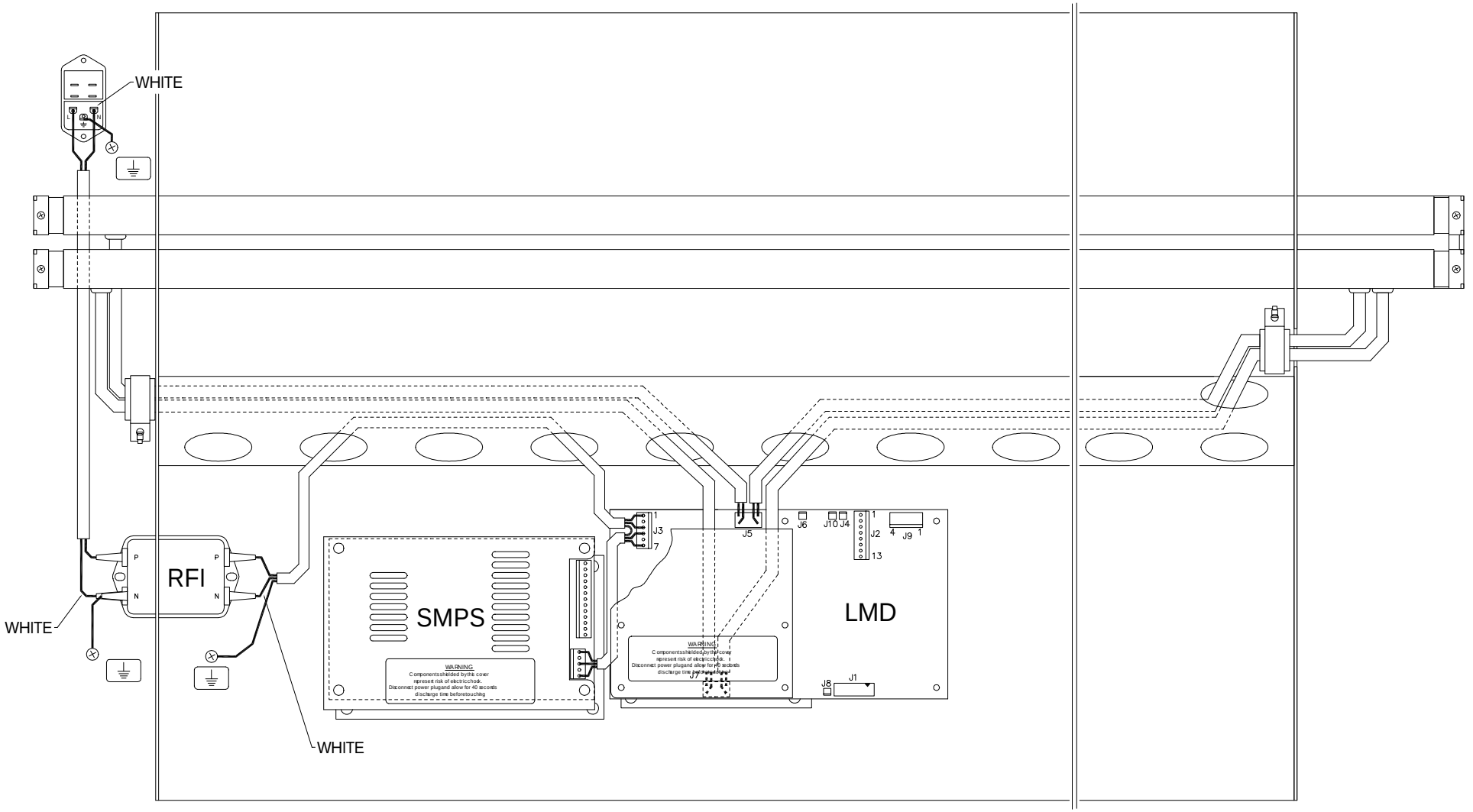


Fig. 12-1 FSC x040 CHROMA Primary Wiring

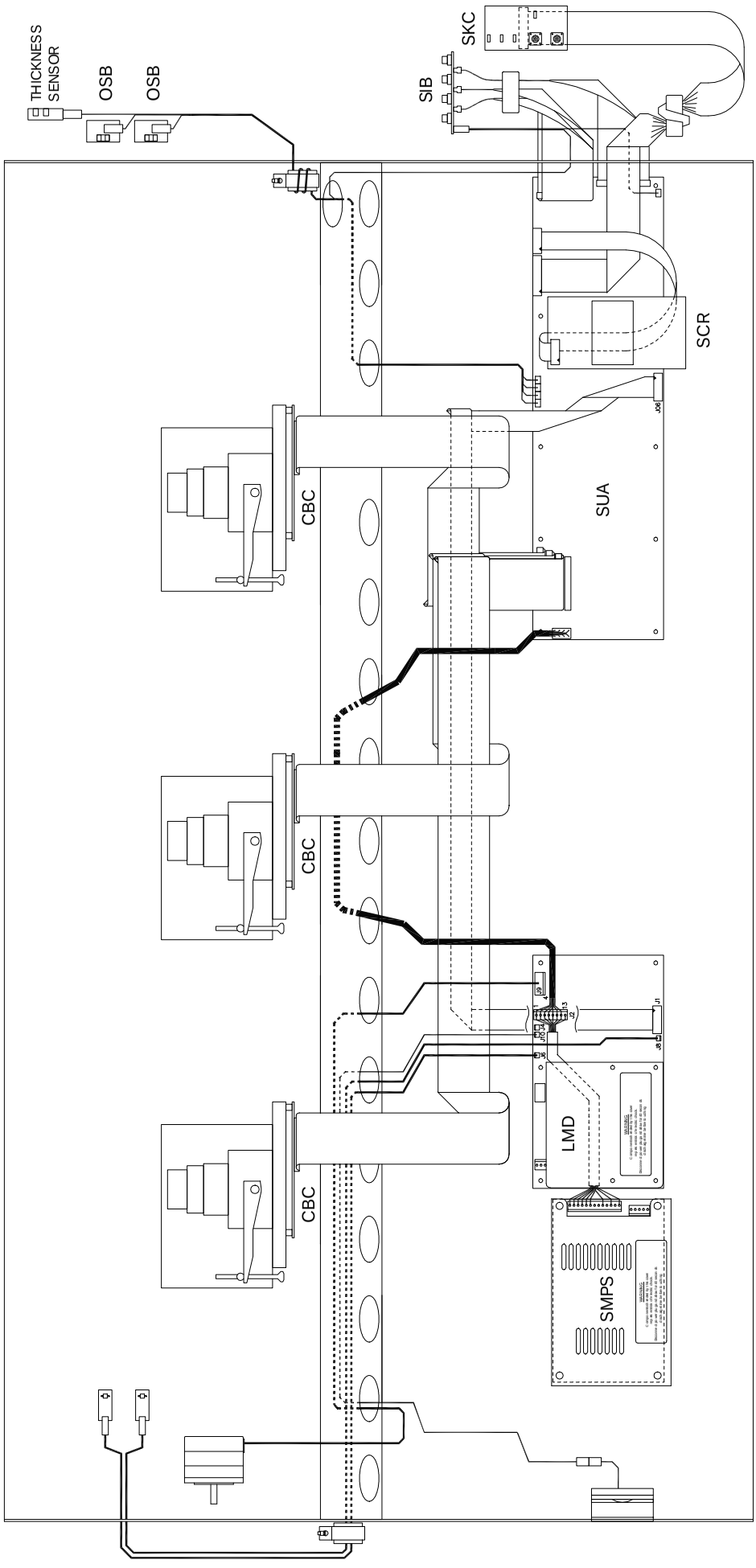


Fig. 12-2 FSC x040 CHROMA Secondary Wiring

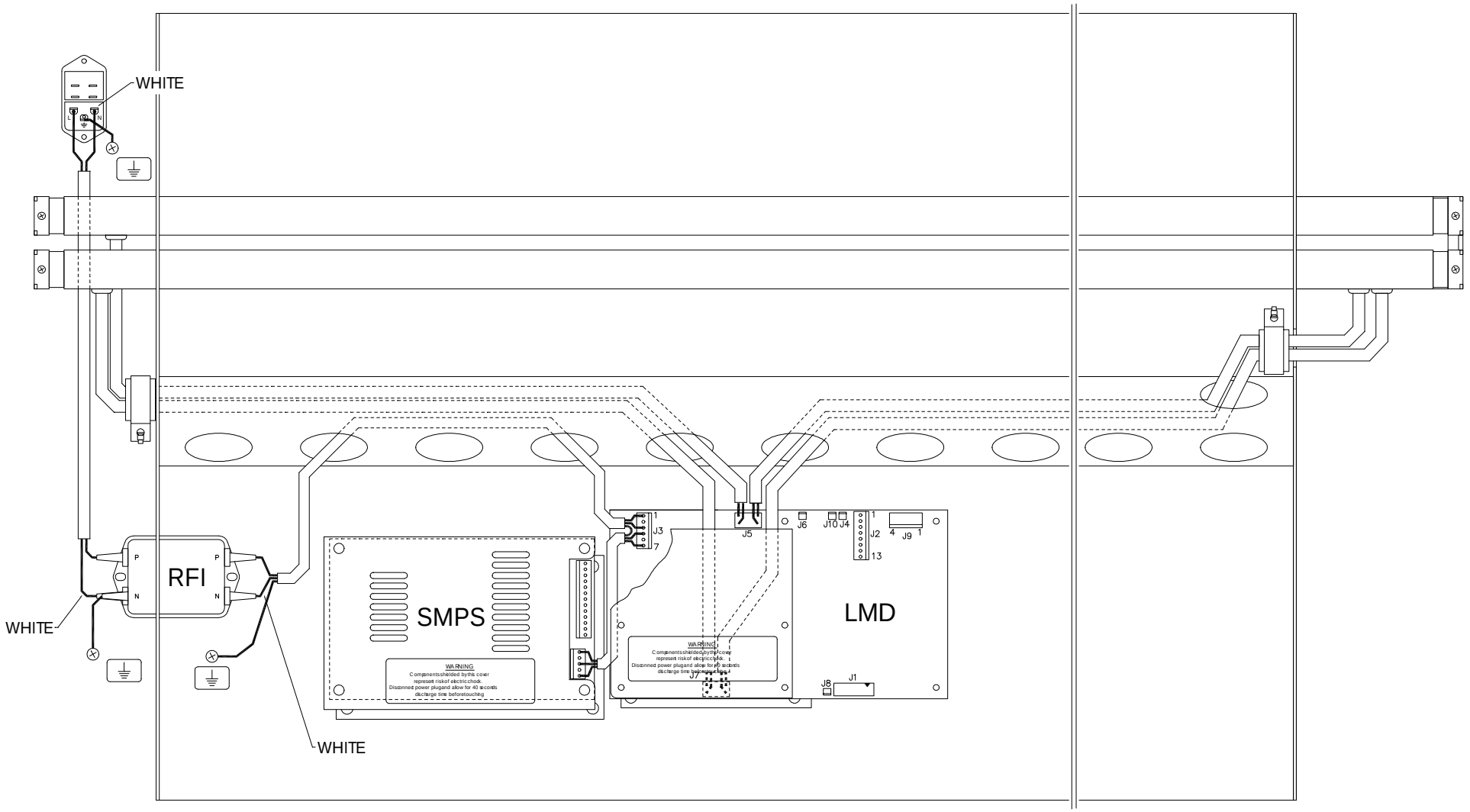


Fig. 12-3 FSC x050 MAGNUM Primary Wiring

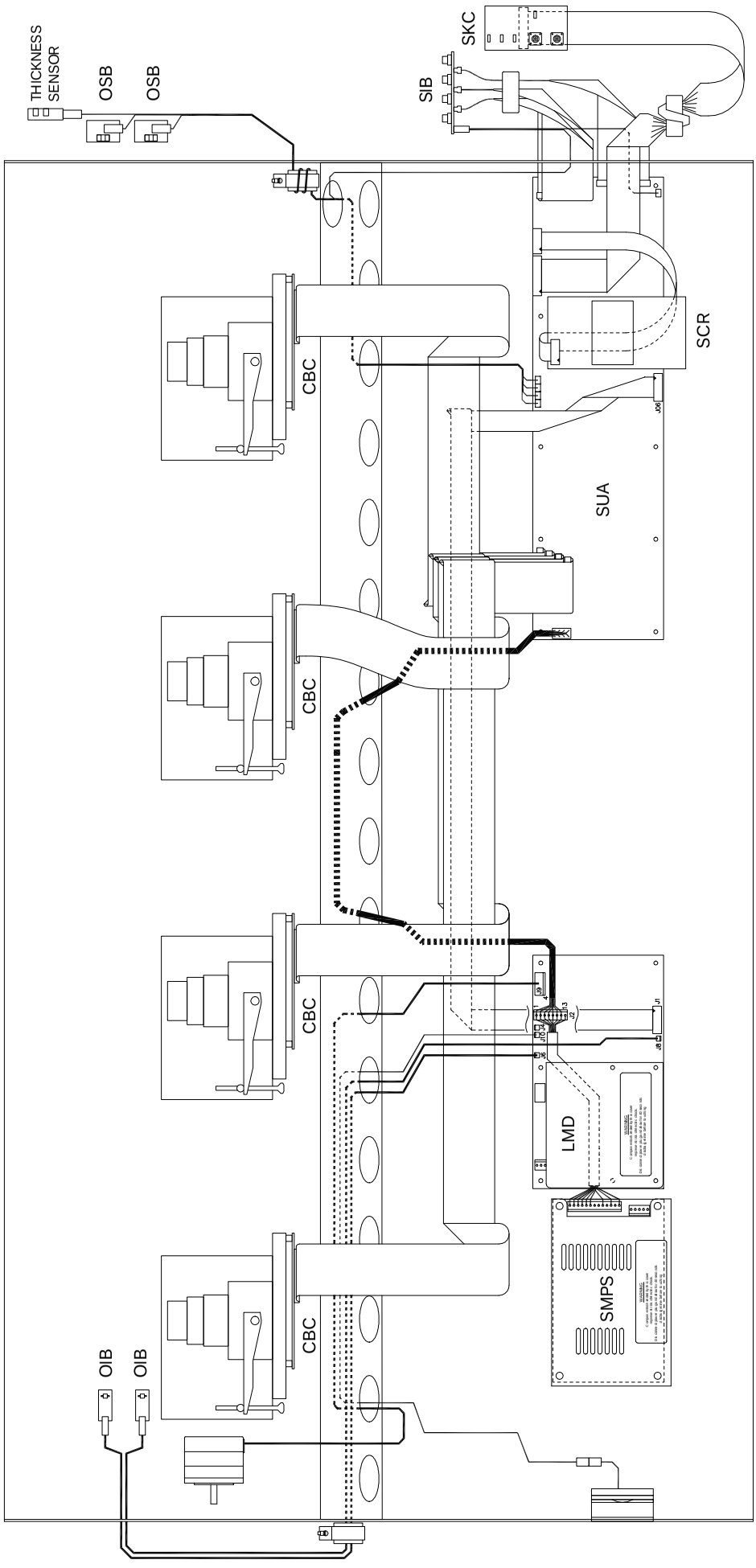


Fig. 12-4 FSC x050 MAGNUM Secondary Wiring

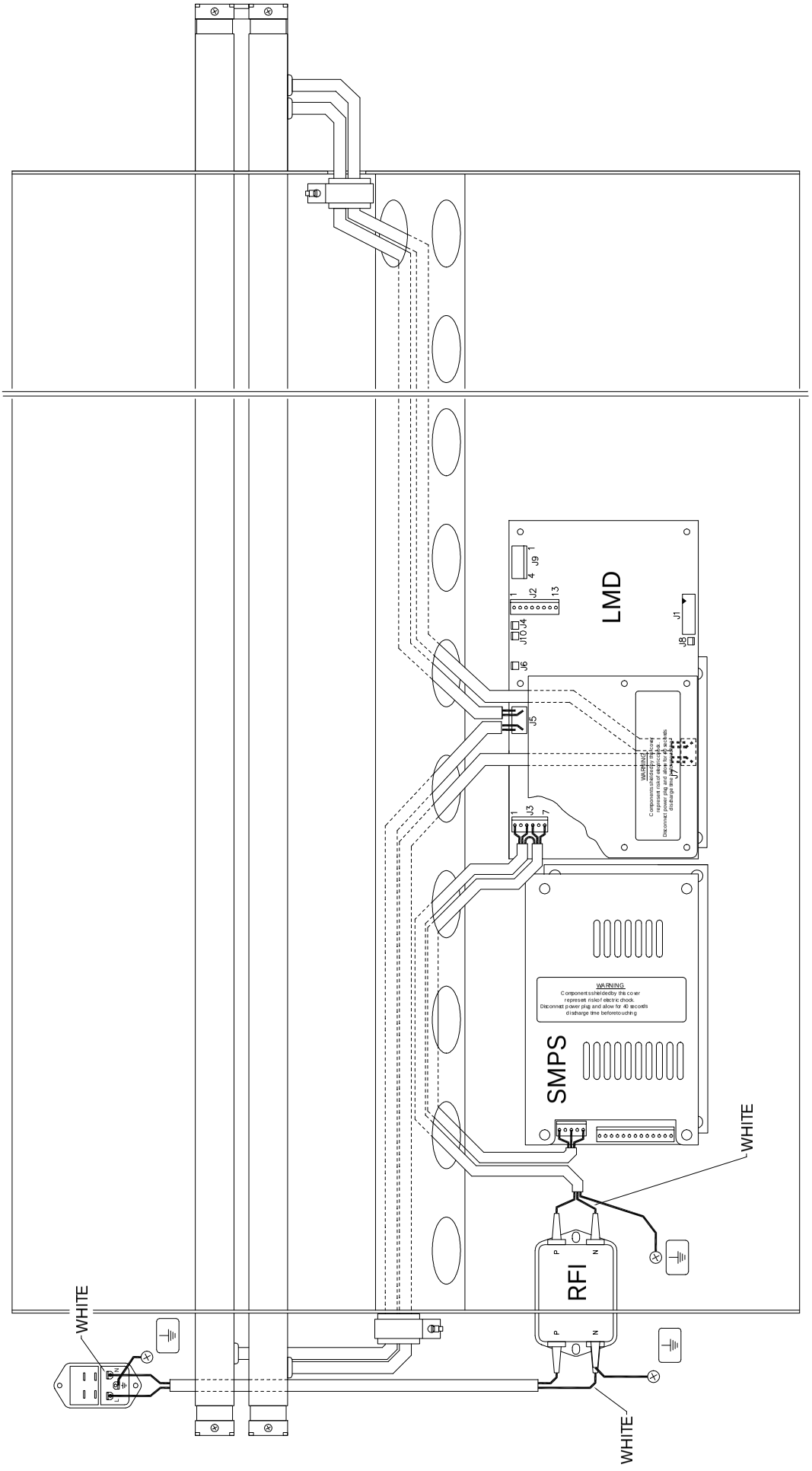


Fig. 12-5 FSS 225x PANORAMA, CRYSTAL 40 Primary Wiring

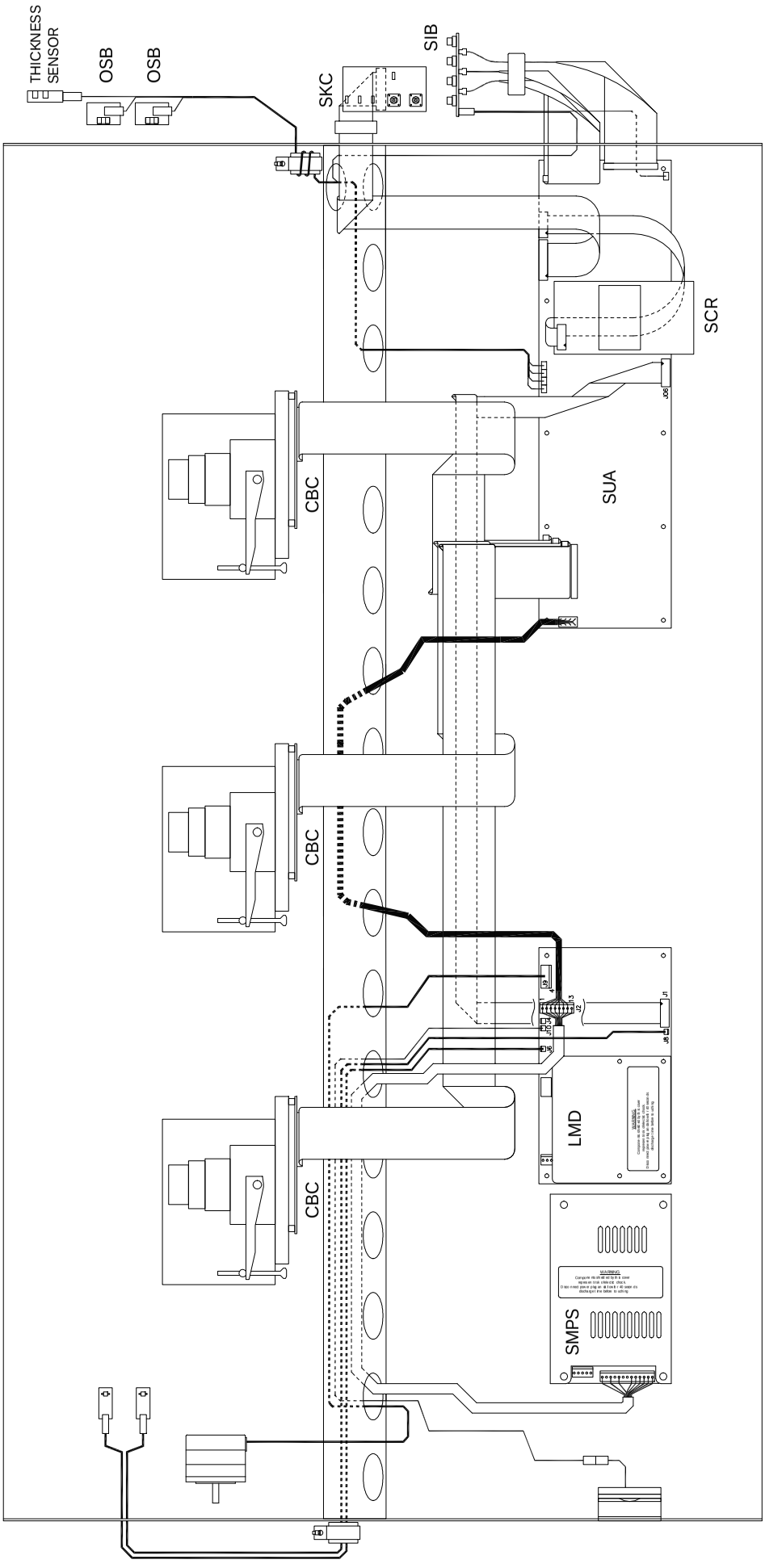


Fig. 12-6 FSS 225x PANORAMA, CRYSTAL 40 Secondary Wiring

13. Special Service Tools

Adjustment and Test Patterns:

Scanner Model:	**FSS 225x PANORAMA and CRYSTAL 40**	**FSC x040 CHROMA**	**FSC x050 MAGNUM**
Optical Adjustment Pattern p/n 6799A135R01	×		
Optical Adjustment Pattern p/n 6799A130R01		×	
Optical Adjustment Pattern p/n 6799A103R01			×
Focus Pattern p/n 6799A219R01	×	×	×
Stitching Adjustment Chart p/n 6399D116	×	×	×
IT8 Color Calibration Sheet p/n 6799A122R01		×	
IT8 Color Calibration Sheet p/n 6799A107R01			×
Basic-Calibration Sheet p/n 6799A201R02	×	×	×

Tools:

Key for Filter Lock Ring p/n 6399E212

For cleaning of the Glass Plate and the White Background Plate use:

Mild cleaning detergent
Soft lint-free cloth
Microfibre Cleaning Cloth

For cleaning of the CCD (ILX518K, ILX508A) use:

A soft lint-free cloth and ethyl alcohol, be careful not to scratch the glass.

TITLE: SPARE PARTS AND SERVICE ACCESSORIES
FSC x040 CHROMA and FSC x050 MAGNUM
FSS 225x PANORAMA and CRYSTAL 40

DOC. NO.: SOF/PLS/007

PREPARED BY: BN

AUTHORIZED: JR

DISTRIBUTION:	Tegningsarkiv, Svendborg	(1)
	PT, Svendborg	(1)
	DD	(1)

ISSUE REVISION: 1.6
DATE: 2002-09-13

A P P R O V E D B Y:

AUTHORITY	DATE	SIGNATURE

This document is the property of Contex A/S. The data contained herein, in whole or in part, may not be duplicated, used or disclosed outside the Recipient for any purpose other than to conduct technical evaluation. This restriction does not limit the Recipients right to use information contained in the data if it is obtained from another source without restriction.

contex
SCANNING TECHNOLOGY

Document Revision Record

DRR

REV.	DATE	CHANGED BY	PAGES AFFECTED	BRIEF DESCRIPTION OF CHANGE
1.0	990610	BN	All	Original Issue of Document
1.1	990924	BN	All	Update as per Appendix A.1
1.2	991102	BN	All	Parts for CHROMA added. 6563A214 removed. 6704A806 canceled, replaced by 6704A809R01. Prices for Spare Part Kits updated.
1.3	000301	BN	All	Part for PANORAMA added Magnetic Paper Guides, 6799A121 added 0002U044 changed to 0002U035 (error corr.)
1.4	000823	BN	All	Parts for “Stand w. oval legs” added Glass Plates 6729A128R01 and 6729A136R01 replaced by 6729A137R01. Adj. screw 2205A137 for Rec. Table added
1.5	010227	BN	All	Parts for CRYSTAL 40 added 000S2653R01 changed to 6729A332R01
1.6	020913	BN	All	SM Calibration Sheets added

Table of Contents

1. Introduction
2. Spare Parts List
4. Service Accessories
A.1 Update from rev. 1.0 to 1.1

---

1. Introduction

This document contains the Spare Parts and Service Accessories Lists for the Wide Format Color Scanner models FB67A (CHROMA) and FA67A (MAGNUM) and Wide Format Monochrome models FC67A (PANORAMA) and FD67A (CRYSTAL 40)

Product Names:

FSC3040 CHROMA
FSC6040 CHROMA
FSC8040 CHROMA

FSC3050 MAGNUM
FSC6050 MAGNUM
FSC8050 MAGNUM

FSS2250 PANORAMA
FSS2251 PANORAMA

CRYSTAL 40

See: **Appendix A.1 Update from rev. 1.0 to 1.1**

Description	Part Number	CRY STAL 40	FSS 225x PAN	FSC x040 CHR	FSC x050 MAG
2. Spare Parts List					
PCB's					
LMDA, Lamp and Motor Driver Board	6739A001	x	x	x	x
OSBC, Optical Sensor Board	3132A003	x	x	x	x
OIBA, Optical Interrupter Board	6336A001	x	x	x	x
CBCA, Camera Board (with CCD-Sensor and Mounting Plate)	6737A001			x	x
CBBB, Camera Board (with CCD-Sensor and Mounting Plate)	6732A004	x	x		
SUAB, Scanner Unit	6730A002RA1			x	x
SUAC, Scanner Unit	6730A004RA1	x	x		
SKCA, Operator Panel	6736A001	x	x	x	x
SIBA, SCSI Connector Board	6734A001	x	x	x	x
SCR, Smart Card Reader, Assembly	6753A104	x	x	x	x
Switch Mode Power Supply, Adjusted	0080A053	x	x	x	x
Electrical Parts					
Socket for Fluorescent Lamp, Front Left	6765A106	x	x	x	x
Socket for Fluorescent Lamp, Rear Left	6765A107	x	x	x	x
Socket for Fluorescent Lamp, Double Right	6765A108	x	x	x	x
Fluorescent Lamp, TLD 58W/950, 1500 mm	0075D010R01	x	x	x	x
Stepper Motor	6337E105R01	x	x	x	x
Cooling Fan	0080C015	x	x	x	x
Dust Filter for Cooling Fan	6705A225	x	x	x	x
Optocoupler (Thickness Detector)	0075A024	x	x	x	x
Cable Ties	0002E009	x	x	x	x
Magnet Catcher for SCR	6753A214	x	x	x	x
Self-Adhesive Cable Clips, 9 mm	0002E026	x	x	x	x
Flat Cable, SUA-SCR	6738A121	x	x	x	x
Insulation for Power Supply Board (LMD)	6337E201	x	x	x	x
Insulation for SMPS	6738A201	x	x	x	x
Power Entry Module	6738A122	x	x	x	x
RFI-Filter	0077E016	x	x	x	x
EMC Contact Spring for SKC	6702A259	x	x	x	x
Fuses					
LMD					
T2.0AH, IEC127-2/5, UL Rec., 5x20 mm	0177A060202	x	x	x	x
SMPS					
F4A, IEC127-2/2, UL Rec., 5 x 20 mm	0177A030402	x	x	x	x
Mechanical Parts					
End Cover (Right Hand Side)	6702A203	x	x	x	x
End Cover (Left Hand Side)	6702A204	x	x	x	x
Top Cover with Front Profile (with SCR)	6702A122				x
Top Cover with Front Profile (without SCR)	6702A115				x
Top Cover with screws for SCR	6702A714				x
Top Cover without screws for SCR	6702A709		x		x
Front Profile	6702A809R01	x	x	x	x
Top Cover with Front Profile	6702A120			x	
Top Cover with Front Profile	6702A124		x		
Top Cover with Front Profile	6702A125	x			
Top Cover	6702A711			x	
Top Cover	6702A715	x			
Model Streamer for FSC 3050 MAGNUM (Contex)	6704A104				x

Description	Part Number	CRY STAL 40	FSS 225x PAN	FSC x040 CHR	FSC x050 MAG
Model Streamer for FSC 6050 MAGNUM (Contex)	6704A102				x
Model Streamer for FSC 8050 MAGNUM (Contex)	6704A101				x
Model Streamer for FSC 3040 CHROMA (Contex)	6704A107			x	
Model Streamer for FSC 6040 CHROMA (Contex)	6704A106			x	
Model Streamer for FSC 8040 CHROMA (Contex)	6704A105			x	
Model Streamer for FSS 2250 PANORAMA (Contex)	6704A108		x		
Model Streamer for FSS 2251 PANORAMA (Contex)	6704A109		x		
Model Streamer for CRYSTAL 40 (Contex)	6704A110	x			
Top Profile (Lid)	6702A802	x	x	x	x
Streamer with Ruler, 50" (for Lid)	6704A806		x		x
Streamer with Ruler, 40" (for Lid)	6704A813	x		x	
Friction Pad for Ruler (packed 10 pcs.)	6729A328R01	x	x	x	x
Bearing for Top Profile (Lid)	6702A246	x	x	x	x
Hinge with Pivot, Left	6702A116	x	x	x	x
Hinge with Pivot, Right	6702A117	x	x	x	x
Rear Cover with Bottom Plate	6702A123R01				x
Rear Cover	6702A808	x	x	x	x
Original Feed System					
Original Guide Plate, complete	6729A124	x	x	x	x
Slider for Media Thickness Adjustment	6729A123	x	x	x	x
Guide Bushings for Slider (packed, 10 pcs.)	6729A302R01	x	x	x	x
White Background Plate, packed	6729A807R01	x	x	x	x
Actuator for Original Entry Sensor	6764A107	x	x	x	x
Torsion Spring for Original Entry Sensor	6764A206	x	x	x	x
Actuator for Original Exit Sensor	6764A106	x	x	x	x
Torsion Spring for Original Exit Sensor	6764A205	x	x	x	x
Bearing for Original Sensor Lever	6364B217	x	x	x	x
Shutter for Original Sensor	6364A102	x	x	x	x
Shaft with Feed-Rollers (16)	6729A103R01	x	x	x	x
Jointning Tongue	6329E220	x	x	x	x
Drive Belt for Feed-Rollers, HTD 564-3M	6363E223	x	x	x	x
Intermediate Belt Wheel	6763A103	x	x	x	x
Drive Belt Tightener	6763A102	x	x	x	x
Bearing Bracket w. Vibration Dampers	6763A101	x	x	x	x
Motor Pulley with Shaft	6763A106	x	x	x	x
Vibration Damper (Grommet) for Bearing Bracket	0006E015	x	x	x	x
Bushing for Damper	6252X219	x	x	x	x
Vibration Damper for Feed Motor	6763A107	x	x	x	x
Lock Washer for 6763A107	0002U035	x	x	x	x
Shield over Entry Feed Roller Shaft	6702A710	x	x	x	x
Shield over Exit Feed Roller Shaft	6702A803	x	x	x	x
Fixing Screws for Roller Shields	6702A212	x	x	x	x
Glass Plate, packed	6729A137R01	x	x	x	x
Bearings for Glass Plate (packed, 10 pcs.)	6729A305R01	x	x	x	x
Mounting Screws for Glass Plate (packed, 10 pcs.)	6729A332R01	x	x	x	x
Magnetic Tape on glass plate (1300 x 8 mm)	6729A304	x	x	x	x
Magnetic Tape on chassis (1300 x 16 mm)	6729A327	x	x	x	x
Contact Pad for Glass Plate	6729A322			x	x
Magnetic Paper Guides, packed	6799A121	x	x	x	x
Optical System					
Mirror Chassis, 50 inch (4 Cam)	6775A129				x
Mirror Chassis, 50 inch (3 Cam)	6775A145	x	x		
Mirror Chassis, 40 inch	6775A139			x	

Description	Part Number	CRYSTAL 40	FSS 225x PAN	FSC x040 CHR	FSC x050 MAG
Lens Adapter for 6375E125/131/136	6375E224			x	x
Lens Adapter for 6375E119	6375E242	x	x		
Focus Lock Ring for 6375E117/118/119/125/131/136	6375E230	x	x	x	x
Lens, Ace FE40	6375E131			x	x
Lens, Ace FD90	6375E119	x	x		
UV / IR Filter	6375E241			x	x
Stitching Wire, dia. = 0.3 mm (black)	6375E801R01	x	x	x	x
Leaf Spring for Stitching Wire	6729A205	x	x	x	x
Tension Spring for Vertical Alignment Arm	6775A264	x	x	x	x
Tension Spring for Cameral Alignment	6775A252	x	x	x	x
Tension Spring for Camera Base Plate	6775A253	x	x	x	x
Telescopic Tube for Vertical Alignment Screw	6775A142	x	x	x	x
Stand w. rectangular legs					
Base Frame for Scanner Bogie	2205A701	x	x	x	x
Torsion Tube	2205A702	x	x	x	x
Leg (Right Hand Side)	2205A703	x	x	x	x
Leg (Left Hand Side)	2205A704	x	x	x	x
Round Plug	2105A216	x	x	x	x
Rubber Grommet for Collection Basket	0006E014	x	x	x	x
Collection Basket, Complete	2205A707	x	x	x	x
Stand w. oval legs					
Base	2205A715	x	x	x	x
Top Bar	2205A718	x	x	x	x
Left Leg	2205A716	x	x	x	x
Right Leg	2205A717	x	x	x	x
Collection Basket, Complete	2205A714	x	x	x	x
Stand, common parts					
Castor w/o Brake for Scanner Bogie	2205A109	x	x	x	x
Castor with Brake for Scanner Bogie	2205A110	x	x	x	x
Fixing Screw for Scanner	2205A211	x	x	x	x
Receiving Table					
Height Adjustment Screw	2205A137	x	x	x	x
Scanner Accessories					
AT-to-SCSI Host Adapter (ASPI) for PCI Bus	0090B019	x	x	x	x
SCSI Cable, HD50/HD50	0090B030	x	x	x	x
3. Service Accessories					
Optical Adjustment Pattern	6799A103R01				x
Optical Adjustment Pattern	6799A130R01			x	
Optical Adjustment Pattern	6799A135R01	x	x		
Focus Pattern	6799A219R01	x	x	x	x
Stitching Adjustment Chart	6399D116	x	x	x	x
Height Alignment Chart	6399A102	x	x	x	x
IT8 Color Calibration Sheet	6799A107R01				x
IT8 Color Calibration Sheet	6799A122R01			x	
Basic-Calibration Sheet (3 pcs.)	6799A201R02	x	x	x	x

Description	Part Number	CRY STAL 40	FSS 225x PAN	FSC x040 CHR	FSC x050 MAG
SM Calibration Sheet, 50", packed	6799A158		x		x
SM Calibration Sheet, 40", packed	6799D116R01	x		x	
Key for Filter Lock-ring on Lens 6375E131/136	6399E212			x	x

A.1 Update from rev. 1.0 to 1.1

Smart Card Reader (SCR) removed from Top Cover:

Top Cover with Front Profile (with SCR)	p/n 6702A122
Top Cover with Front Profile (without SCR)	p/n 6702A115

- 6702A122 is used in FSC x050 MAGNUM up to s/n 00275
- 6702A115 is used in FSC x050 MAGNUM from s/n 00276

Top Cover with screws for SCR	p/n 6702A714
Top Cover without screws for SCR	p/n 6702A709

- 6702A714 is used in FSC x050 MAGNUM up to s/n 00275
- 6702A709 is used in FSC x050 MAGNUM from s/n 00276

Integrated Rear Cover and Bottom Plate separated into two parts:

Rear Cover with Bottom Plate	p/n 6702A123R01
Rear Cover	p/n 6702A808

- 6702A123R01 is used in FSC x050 MAGNUM up to s/n 00334
- 6702A808 is used in FSC x050 MAGNUM from s/n 00335

Changed Parts:

6702A115:
"Top Cover Assy. (Incl. Smart Card Reader and Front Profile)" changed to "Top Cover with

6702A709:
"Top Cover" changed to "Top Cover without screws for SCR"

Part Numbers added:

Rear Cover with Bottom Plate	p/n 6702A123R01
Rear Cover	p/n 6702A808
Top Cover with screws for SCR	p/n 6702A714
Top Cover with Front Profile (with SCR)	p/n 6702A122
Friction Pad for Ruler (packed, 10 pcs)	p/n 6729A328R01
Flat Cable, SUA-SCR	p/n 6738A121
Magnet Catcher for SCR	p/n 6753A214
Tension Spring for Camera Alignment	p/n 6775A252
Tension Spring for Camera Base Plate	p/n 6775A253
Telescopic Tube for Vertical Alignment Screw	p/n 6775A142
Bearings for Glass Plate (packed, 10 pcs.)	p/n 6729A305R01
Mounting Screws for Glass Plate (packed, 10 pcs.)	p/n 0002S653R01

Guide Bushings for Slider (packed, 10 pcs.)	p/n 6729A302R01
Switch Mode Power Supply, adjusted	p/n 0080A053
T2.0AH, IEC 127-2/5, UL Rec., 5x20 mm	p/n 0177A060202

Part Numbers Removed:

Rear Cover	p/n 6702A804
Mirror145 x 24 x5	p/n 6775A236
Mirror295 x 24 x5	p/n 6775A237
Double Sided Adhesive Tape, 3M No.404032 (Roll, 66m)	p/n KT832245R01
Switch Mode Power Supply	p/n 0080A051
CBCA, Camera Board (w/o CCD-Sensor and Mounting Plate)	p/n 6737A101
CCD-Sensor (ILX518K)	p/n 0075A031
Fixing Clips for CCD	p/n 6775A228
T1.6AH, IEC 127-2/5, UL Rec., 5x20 mm	p/n 0177A060162

Changed Part Description Only:

6729A123:
“Step Plate for Thickness Adjustment” changed to “Slider for Media Thickness Adjustment”

0075D010R01:
“Fluorescent Lamp TLD58/950, 1500 mm” changed to “Fluorescent Lamp TLD 58W/950,

6729A205:
“Spring for Stitching Wire” changed to “Leaf Spring for Stitching Wire”

6704A806:
“Streamer with Ruler (for Lid)” changed to “Streamer with Ruler, 50” (for Lid)”

6702A246:
“Pivot for Top Cover (Lid)” changed to “Bearing for Top Profile (Lid)”

6702A116:
“Hinge for Pivot, Left” changed to “Hinge with Pivot, Left”

6702A117:
“Hinge for Pivot, Right” changed to “Hinge with Pivot, Right”

6729A807R01:
“White Background, packed” changed to “White Background Plate, packed”

6763A101:
“Gear Console Assembly” changed to “Bearing Bracket w. Vibration Damper”

6763A106:
“Motor Belt Wheel w. Shaft” changed to “Motor Pulley with Shaft”

0006E015:
“Vibration Damper for Gear (Grommet)” changed to ”Vibration Damper (Grommet) for

6763A107:
“Vibration Damper Assy. for Feed Motor” changed to “Vibration Damper for Feed Motor”

6764A107:
“Lever for Original Entry Sensor” changed to “Actuator for Original Entry Sensor”

6764A106:
“Lever for Original Exit Sensor” changed to “Actuator for Original Exit Sensor”

Parts with changed prices (EUR):

6702A115, Top Cover with Front Profile (without SCR):	From 210.41 to 178.75
6702A709, Top Cover without screws for SCR:	From 99.97 to 73.04

contex SCANNING TECHNOLOGY	Technical Service Bulletin	DOCUMENT NO. (REV) FSF/TSB/001 (1.0)

DATE	INIT.	SUBJECT: Ageing of Fluorescent Lamps	PAGE
030623	LM	APPLY TO: MAGNUM, CHROMA, PANORAMA, CRYSTAL	1 OF 1

DESCRIPTION:

It has been observed that some lamps at the end of life (more than 8.000 hours) in rare cases can cause the lamp driver board (LMD) to fail. In such a case the lamp driver board needs to be replaced.
If only the board is replaced the new board will also be damaged.

RECOMMENDED ACTION:

1. When replacing a lamp and motor driver board it is recommended to also replace the lamps.
2. As a preventive measure it is recommended to replace lamps after 8.000 hours or every second year whatever comes first.

DISTRIBUTION: Tegn. arkiv, DD

contex SCANNING TECHNOLOGY	Technical Service Bulletin	DOCUMENT NO. (REV) FSF/TSB/002 (1.0)

DATE	INIT.	SUBJECT: Cracking solder joints on SMPS	PAGE
030922	LM	APPLY TO: MAGNUM, CHROMA, PANORAMA, CRYSTAL	1 OF 2

DESCRIPTION:

On some SMPS's it has been found that the solder joints of the output connector P2 (see figure on page 2) tend to crack. This may result in unstable supply voltages causing the scanner to report errors or showing up as color mismatch between cameras.
The cause of the cracked solder joints could be defective crimp terminals with too low contact pressure. This could heat up the connector pin causing the solder joint to crack and in extreme cases it can lead to discoloring of the connector due to increased temperature.

The problem has only been reported with MAGNUM and CHROMA scanners but it can not be ruled out that it can also be found with PANORAMA and CRYSTAL.

RECOMMENDED ACTION:

Contex recommend to check the soldering of P2 and possibly change the power supply cable only when a problem is reported, or at regular service calls.

New power supply cables with high performance crimp terminals are available from Contex under the following part numbers:

MAGNUM/CHROMA:	Cable, SMPS - LMD/SUA type IV	p/n 6738A132
PANORAMA/CRYSTAL:	Cable, SMPS - LMD/SUA type V	p/n 6738A133

In case of a scanner reporting error codes or color mismatch between cameras:

- Remove the SMPS and check the soldering of output connector P2. At any signs of cracking or the like resolder all joints. As initial cracking can be difficult to see with the naked eye it is recommended to resolder all joints just in case.
  After replacing the SMPS check/adjust the +5.3V output to be (see page 2):

  P2, pin 1, 2, 3 +5.3 V +0/-0.1 V

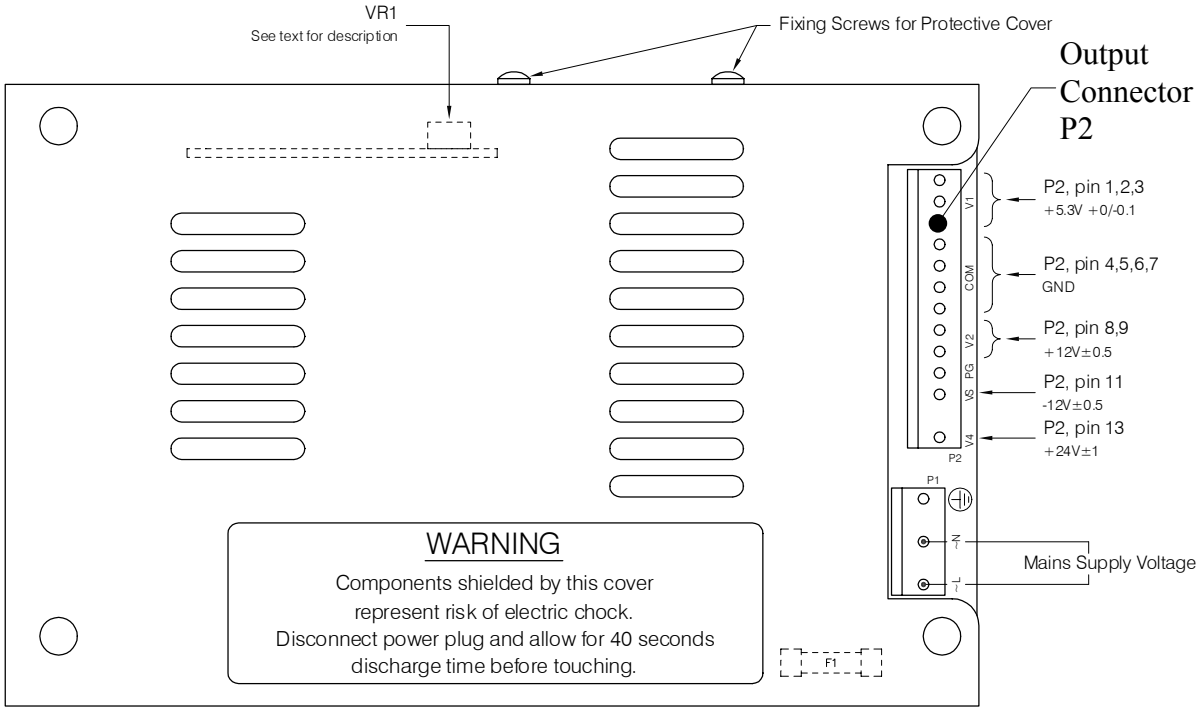
- In case of any signs of discoloring of the connector or connector housing the cable should be replaced. As a preventive measure it is recommended to change the power supply cable if one is at hand.

DISTRIBUTION: FSF/TSM/001

DC Voltages

P2, pin 1, 2, 3	+5.3V +0/-0.1V *
P2, pin 4, 5, 6, 7	GND
P2, pin 8, 9	+12V ± 0.5V
P2, pin 11	-12V ± 0.5V
P2, pin 13	+24V ± 1V

* If the +5.3V supply is not within these limits it is adjusted by potentiometer VR1 located on a small vertical board in the SMPS.



Adjustment Procedure:

It is very difficult to make this adjustment because VR1 is located under the protection cover. To make the adjustment:

- Turn off the mains supply voltage and disconnect the power plug
- Loosen the SMPS, remove the protection cover and move the SMPS partly out of the scanner to get access to VR1
- Place the SMPS on a non conductive surface and make sure that none of the circuits on the exposed bottom side nor any components short circuit to scanner chassis

CAUTION: *Moving the SMPS away from its normal position and removing the protection cover expose components and circuits on the both sides of the SMPS, which are connected directly to the line voltage and constitute a risk of electric shock, or injury to persons.*

- Connect the power plug and switch power ON
- Adjust VR1
- Turn off the mains supply voltage and disconnect the power plug
- Replace the SMPS

contex SCANNING TECHNOLOGY	Technical Service Bulletin	DOCUMENT NO. (REV) FSF/TSB/003 (1.0)

DATE	INIT.	SUBJECT: SMPS with Fan	PAGE
050607	LM	APPLY TO: MAGNUM, CHROMA, PANORAMA, CRYSTAL	1 OF 1

DESCRIPTION:

A fan has been added to the SMPS for the 5G scanners to help reduce temperature and humidity, where longtime exposure to these environmental factors have sometimes been seen to cause failure.

In the light of this the spare part number has been changed from 0080A053R01 to 0080A053RA1. Any future orders on 0080A053R01 will however be converted to the new part.

RECOMMENDED ACTION:

No particular action is recommended. The purpose of this TSB is just to inform about the change.

DISTRIBUTION: FSF/TSM/001